SECTION 01010
GENERAL REQUIREMENTS

TABLE OF CONTENTS

SECTION 16050 EVL.
BASIC METHODS AND REQUIREMENTS (ELECTRICAL)

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section, Basic Methods and Requirements (Electrical) applies to all sections of Division 16.

B. Furnish and install electrical wiring, systems, equipment and accessories in accordance with the specifications and drawings. Capacities and ratings of motors, transformers, cable, switchboards, switchgear, panelboards, motor control centers, and other items and arrangements for the specified items are shown on drawings.

C. Electrical service entrance equipment (arrangements for temporary and permanent connections to the power company's system) shall conform to the power company's requirements. Coordinate fuses, circuit breakers and relays with the power company's system, and obtain power company approval for sizes and settings of these devices.

D. Wiring ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways accordingly sized. Aluminum conductors are prohibited.

1.2 MINIMUM REQUIREMENTS

A. References to the National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), and National Fire Protection Association (NFPA) are minimum installation requirement standards.

B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

1.3 TEST STANDARDS

A. All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc., standards where test standards have been established. Equipment and materials which are not covered by UL Standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as NEMA, or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.

B. Definitions:

1. Listed; equipment or device of a kind mentioned which:
   a. Is published by a nationally recognized laboratory which makes periodic inspection of production of such equipment.
   b. States that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.
2. Labeled; equipment or device is when:
   a. It embodies a valid label, symbol, or other identifying mark of a nationally recognized testing laboratory such as Underwriters Laboratories, Inc.
   b. The laboratory makes periodic inspections of the production of such equipment.
   c. The labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.
3. Certified; equipment or product is which:
   a. Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner.
   b. Production of equipment or product is periodically inspected by a nationally recognized testing laboratory.
   c. Bears a label, tag, or other record of certification.
4. Nationally recognized testing laboratory; which is approved, in accordance with OSHA regulations, by the Secretary of Labor.

1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)

A. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.

B. Product Qualification:
   1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
   2. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

1.5 MANUFACTURED PRODUCTS

A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts shall be available.

B. When more than one unit of the same class of equipment is required, such units shall be the product of a single manufacturer.

C. Equipment Assemblies and Components:
   1. Components of an assembled unit need not be products of the same manufacturer.
   2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
   3. Components shall be compatible with each other and with the total assembly for the intended service.
   4. Parts which are similar shall be the product of a single manufacturer.

D. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.

E. When Factory Testing Is Specified:
   1. The Government shall have the option of witnessing factory tests. The contractor shall notify the VA through the Project Engineer a minimum of 15 working days prior to the manufacturers making the factory tests.
   2. Four copies of certified test reports containing all test data shall be furnished to the Project Engineer prior to final inspection and not more than 90 days after completion of the tests.
   3. When equipment fails to meet factory test and reinspection is required, the contractor shall be liable for all additional expenses, including expenses of the Government.

1.6 EQUIPMENT REQUIREMENTS

Where variations from the contract requirements are requested in accordance with Section 01001, GENERAL CONDITIONS and Section 01340, SAMPLES AND SHOP DRAWINGS, the connecting work and related components shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

1.7 EQUIPMENT PROTECTION

Equipment and materials shall be protected during shipment and storage against physical damage, dirt, moisture, cold and rain.

A. During installation, enclosures, equipment, controls, controllers, circuit protective devices, and other like items, shall be protected against entry of foreign matter; and be vacuum cleaned both inside and outside before testing and operating and repainting if required.

B. Damaged equipment shall be, as determined by the Project Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.

C. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.

D. Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.8 WORK PERFORMANCE

A. Arrange, phase and perform work to assure electrical service for other buildings at all times. Refer to Article OPERATIONS AND STORAGE AREAS under Section 01010, GENERAL REQUIREMENTS.

B. New work shall be installed and connected to existing work neatly and carefully. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Section 01010, GENERAL REQUIREMENTS.

C. Coordinate location of equipment and conduit with other trades to minimize interferences. See Section 01001, GENERAL CONDITIONS.

1.9 EQUIPMENT INSTALLATION AND REQUIREMENTS

A. Equipment location shall be as close as practical to locations shown on the drawings.

B. Working spaces shall not be less than specified in the NEC for all voltages specified.

C. Inaccessible Equipment:

1. Where the Government determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Government.
2. "Conveniently accessible" is defined as being capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping, and ductwork.

1.10 EQUIPMENT IDENTIFICATION

A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.

B. Nameplates shall be laminated black phenolic resin with a white core with engraved lettering, a minimum of 6 mm (1/4-inch) high. Secure nameplates with screws. Nameplates that are furnished by manufacturer as

a standard catalog item, or where other method of identification is herein specified, are exceptions.

1.11 SUBMITTALS

A. Submit in accordance with section 01340, SAMPLES AND SHOP DRAWINGS.

B. The Government's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.

C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.

D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1. Mark the submittals, "SUBMITTED UNDER SECTION “14225".
2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
3. Submit each section separately.

E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
2. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
3. Parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price and availability of each part.

F. Manuals: Submitted in accordance with Section 01010, GENERAL REQUIREMENTS.

1. Maintenance and Operation Manual: Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders, (manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.

2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
4. The manual shall include:
   a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
   b. A control sequence describing start-up, operation, and shutdown.
   c. Description of the function of each principal item of equipment.
   d. Installation and maintenance instructions.
   e. Safety precautions.
   f. Diagrams and illustrations.
   g. Testing methods.
   h. Performance data.
   i. Lubrication schedule including type, grade, temperature range, and frequency.
   j. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
   k. Appendix; list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

G. Approvals will be based on complete submission of manuals together with shop drawings.

1.12 SINGULAR NUMBER

A. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

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SECTION 01010
GENERAL REQUIREMENTS

1.1 GENERAL INTENTION

A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work for Upgrade Existing Hydraulic Elevators Bldg. P-1, P-2/ Hydraulic Elevators Bldg. 11 P-3 and P-4/Traction Elevators Bldg. 11, E-1, E-2, and E-4.

B. Visits to the site by Bidders may be made only by appointment with the Medical Center Engineering Officer.

C. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA police, be identified by project and employer, and restricted from unauthorized access.

D. Prior to commencing work, general contractor shall provide proof that a OSHA certified "competent person" with a 30 hour OSHA Certified Construction Safety Course (CP) (29 CFR 1926.20 (b) (2) will maintain a presence at the work site whenever the general or subcontractors are present.

E. Training:

1. Beginning July 31, 2005, all employees of general contractor or subcontractors shall have the 10-hourOSHA certified Construction Safety course and /or other relevant competency training, as determined by VA CP with input from the ICRA team.
2. Submit training records of all such employees for approval before the start of work.

1.2 STATEMENT OF BID ITEM(S)

A. ITEM I, GENERAL CONSTRUCTION: Upgrade Existing Hydraulic Elevators Bldg. P-1, P-2/ Hydraulic Elevators Bldg. 11 P-3 and P-4/Traction Elevators Bldg. 11, E-1, E-2, and E-4. Work includes general construction, alterations, mechanical and electrical work, utility systems, elevators and dumbwaiters, necessary removal of existing structures and construction and certain other items.

1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

A. AFTER AWARD OF CONTRACT, 7 sets of specifications and drawings will be furnished. These drawings and specifications will consist of those returned by prospective bidders.

B. Additional sets of drawings may be made by the Contractor, at Contractor's expense, from reproducible sepia prints furnished by Issuing Office. Such sepia prints shall be returned to the Issuing Office immediately after printing is completed.

1.4 CONSTRUCTION SECURITY REQUIREMENETS

A. Security Plan:

1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.

B. Security Procedures:

1. General Contractor’s employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
2. Regular working hours are 8:00 a.m. to 4:30 p.m. and contractor shall observe all federal holidays. For working outside the “regular hours” as defined in the contract, the General Contractor shall give 3 days notice to the Contracting Officer so that security arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
3. No photography of VA premises is allowed without written permission of the Contracting Officer.
4. VA reserves the right to close down or shut down the project site and order General Contractor’s employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.

C. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the Resident Engineer for the purpose of security inspections of every area of project including tool boxes and parked machines and take any emergency action.
2. The General Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation. See Section 08710, Builders Hardware and coordinate.

D. Document Control:

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of “sensitive information”.
2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
4. Certain documents, sketches, videos or photographs and drawings may be marked “Law Enforcement Sensitive” or “Sensitive Unclassified”. Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the Contracting Officer upon request.
5. These security documents shall not be removed or transmitted from the project site without the written approval of Contracting Officer.
6. All paper waste or electronic media such as CD’s and diskettes shall be shredded and destroyed in a manner acceptable to the VA.
7. Notify Contracting Officer and Site Security Officer immediately when there is a loss or compromise of “sensitive information”.
8. All electronic information shall be stored in specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
    a. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.

b. “Sensitive information” including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.

E. Motor Vehicle Restrictions

1. Vehicle authorization request shall be required for any vehicle entering the site and such request shall be submitted 24 hours before the date and time of access. Access shall be restricted to picking up and dropping off materials and supplies.

1.5 FIRE SAFETY

A. Applicable Publications: Publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

1. American Society for Testing and Materials (ASTM):
   E84-2007.....Surface Burning Characteristics of Building Materials
2. National Fire Protection Association (NFPA):
   10-2006 .....Standard for Portable Fire Extinguishers
   30-2003 .....Flammable and Combustible Liquids Code
   51B-2003.....Standard for Fire Prevention During Welding, Cutting and Other Hot Work
   70-2005 .....National Electrical Code
   241-2004 .....Standard for Safeguarding Construction, Alteration, and Demolition Operations
3. Occupational Safety and Health Administration (OSHA):
   29 CFR 1926.....Safety and Health Regulations for Construction

B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to Project Engineer for review for compliance with contract requirements in accordance with Section 01340, SAMPLES AND SHOP DRAWINGS. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor’s competent person per OSHA requirements. This briefing shall include information on the construction limits, VAMC safety guidelines, means of egress, break areas, work hours,

locations of restrooms, use of VAMC equipment, etc. Documentation shall be provided to the Resident Engineer that individuals have undergone contractor's safety briefing.

C. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.

D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).

E. Temporary Construction Partitions:

1. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas the areas that are described in phasing requirements and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of fire retardant treated wood or metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire/smoke rated doors with self-closing devices.
2. Install one-hour fire-rated temporary construction partitions as shown on drawings to maintain integrity of existing exit stair enclosures, exit passageways, fire-rated enclosures of hazardous areas, horizontal exits, smoke barriers, vertical shafts and openings enclosures.
3. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials in accordance with Section 07270, FIRESTOPPING SYSTEMS.

F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.

G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Project Engineer.

H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Project Engineer.

I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.

J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

K. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with Project Engineer. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the Project Engineer.

L. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with Project Engineer.

M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Project Engineer. Obtain permits from facility Safety Manager Officer at least 24 hours in advance.

N. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Project Engineer.

O. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.

P. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.

Q. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

R. If required, submit documentation to the Project Engineer that personnel have been trained in the fire safety aspects of working in areas with impaired structural or compartmentalization features.

1.6 OPERATIONS AND STORAGE AREAS

A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

C. The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

D. Working space and space available for storing materials shall be as determined by the Project Engineer.

E. Workmen are subject to rules of Medical Center applicable to their conduct. Execute work in such a manner as to interfere as little as possible with work being done by others. Keep roads clear of construction materials, debris, standing construction equipment and vehicles at all times.

F. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in

buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by Project Engineer where required by limited working space.

1. Do not store materials and equipment in other than assigned areas.
2. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access to Medical Center areas required to remain in operation.
3. Where access by Medical Center personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements.

Utilities Services: Where necessary to cut existing pipes, electrical wires, conduits, cables, etc., of utility services, or of fire protection systems or communications systems (except telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by Project Engineer. All such actions shall be coordinated with the Utility Company involved:

1. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.

G. Phasing: To insure such executions, Contractor shall furnish the Project Engineer with a schedule of approximate phasing dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, Contractor shall notify the Project Engineer two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such phasing dates to insure accomplishment of this work in successive phases mutually agreeable to Medical Center Director, Project Engineer and Contractor, as follows:

H. Building(s) will be occupied during performance of work. Contractor shall take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and

affected areas to be used in the Medical Centers operations will not be hindered. Contractor shall permit access to Department of Veterans Affairs personnel and patients through other construction areas which serve as routes of access to such affected areas and equipment. Coordinate alteration work in areas occupied by Department of Veterans Affairs so that Medical Center operations will continue during the construction period.

I. When a building is turned over to Contractor, Contractor shall accept entire responsibility therefore.
   1. Contractor shall maintain a minimum temperature of 4 degrees C (40 degrees F) at all times, except as otherwise specified.
   2. Contractor shall maintain in operating condition existing fire protection and alarm equipment. In connection with fire alarm equipment, Contractor shall make arrangements for pre-inspection of site with Fire Department or Company (Department of Veterans Affairs or municipal) whichever will be required to respond to an alarm from Contractor's employee or watchman.

J. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by Project Engineer.
   1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of Project Engineer. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the Medical Center Director’s prior knowledge and written approval. Refer to specification Section 16050 for additional requirements.

2. Contractor shall submit a request to interrupt any such services to Project Engineer, in writing, 48 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
3. Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of // Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
4. Major interruptions of any system, such as, any disruption of elevators in service, electrical systems, HVAC systems, and any other utility systems must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the Project Engineer.
5. In case of a contract construction emergency, service will be interrupted on approval of Project Engineer. Such approval will be confirmed in writing as soon as practical.
6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.

K. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.

L. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles.

1.7 ALTERATIONS

A. Survey: Before any work is started, the Contractor shall make a thorough survey with the Project Engineer buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by both, to the Contracting Officer. This report shall list by rooms and spaces:

1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of building.
2. Existence and conditions of items such as plumbing fixtures and accessories, electrical fixtures, equipment, venetian blinds, shades, etc., required by drawings to be either reused or relocated, or both.
3. Shall note any discrepancies between drawings and existing conditions at site.
4. Shall designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and Resident Engineer.

B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of Project Engineer, to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by Contractor with new items in accordance with specifications which will be furnished by Government. Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly, under provisions of clause entitled "DIFFERING SITE CONDITIONS" (FAR 52.236-2) and "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) of Section 01001, GENERAL CONDITIONS.

C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and Project Engineer together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:

1. Re-survey report shall also list any damage caused by Contractor to such flooring and other surfaces, despite protection measures; and, will form basis for determining

extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.

D. Protection: Provide the following protective measures:
   1. Wherever existing roof surfaces are disturbed they shall be protected against water infiltration. In case of leaks, they shall be repaired immediately upon discovery.
   2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.
   3. Protection of interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place shall be adequately protected prior to starting work, and this protection shall be maintained intact until all work in the area is completed.

1.8 INFECTION PREVENTION MEASURES

A. Implement the requirements of VAMC's Infection Control Risk Assessment (ICRA) team. ICRA Group may monitor dust in the vicinity of the construction work and require the Contractor to take corrective action immediately if the safe levels are exceeded.

B. Establish and maintain a dust control program as part of the contractor's infection preventive measures in accordance with the guidelines provided by ICRA Group as specified here. Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to Project Engineer for review for compliance with contract requirements in accordance with Section 01340, SAMPLES AND SHOP DRAWINGS.
   1. All personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.

C. Medical center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions may be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality. In addition:
   1. The RE and VAMC Infection Control personnel shall review pressure differential monitoring documentation to verify that pressure differentials in the construction zone

and in the patient-care rooms are appropriate for their settings. The requirement for negative air pressure in the construction zone shall depend on the location and type of activity. Upon notification, the contractor shall implement corrective measures to restore proper pressure differentials as needed.

2. In case of any problem, the medical center, along with assistance from the contractor, shall conduct an environmental assessment to find and eliminate the source.

D. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.

1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by Resident Engineer. Blank off ducts and diffusers to prevent circulation of dust into occupied areas during construction.
2. Do not perform dust producing tasks within occupied areas without the approval of the Project Engineer. For construction in any areas that will remain jointly occupied by the medical Center and Contractor's workers, the Contractor shall:
    a. Provide dust proof fire-rated one-hour temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust. Barriers shall be sealed and made presentable on hospital occupied side. Install a self-closing rated door in a metal frame, commensurate with the partition, to allow worker access. Maintain negative air at all times. A fire retardant polystyrene, 6-mil thick or greater plastic barrier meeting local fire codes may be used where dust control is the only hazard, and an agreement is reached with the Project Engineer and Medical Center.
    b. HEPA filtration is required where the exhaust dust may reenter the breathing zone. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. Install HEPA (High Efficiency Particulate Accumulator) filter vacuum system rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. Insure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Exhaust hoses

shall be heavy duty, flexible steel reinforced and exhausted so that dust is not reintroduced to the medical center.

c. Adhesive Walk-off/Carpet Walk-off Mats, minimum 600mm x 900mm (24" x 36"), shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.

d. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as they are created. Transport these outside the construction area in containers with tightly fitting lids.

e. The contractor shall not haul debris through patient-care areas without prior approval of the Project Engineer and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.

f. Using a HEPA vacuum, clean inside the barrier and vacuum ceiling tile prior to replacement. Any ceiling access panels opened for investigation beyond sealed areas shall be sealed immediately when unattended.

g. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.

h. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.

E. Final Cleanup:

1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
3. All new air ducts shall be cleaned prior to final inspection.

1.9 DISPOSAL AND RETENTION

A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, shall be disposed of as follows:
   1. Reserved items which are to remain property of the Government are identified by attached tags or noted on drawings or in specifications as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by Project Engineer.
   2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.
   3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.
   4. PCB Transformers and Capacitors: The Contractor shall be responsible for disposal of the Polychlorinated Biphenyl (PCB) transformers and capacitors. The transformers and capacitors shall be taken out of service and handled in accordance with the procedures of the Environmental Protection Agency (EPA) and the Department of Transportation (DOT) as outlined in Code of Federal Regulation (CFR), Titled 40 and 49 respectively. The EPA's Toxic Substance Control Act (TSCA) Compliance Program Policy Nos. 6-PCB-6 and 6-PCB-7 also apply. Upon removal of PCB transformers and capacitors for disposal, the "originator" copy of the Uniform

Hazardous Waste Manifest (EPA Form 8700-22), along with the Uniform Hazardous Waste Manifest Continuation Sheet (EPA Form 8700-22A) shall be returned to the Contracting Officer who will annotate the contract file and transmit the Manifest to the Medical Center's Chief.

a. Copies of the following listed CFR titles may be obtained from the Government Printing Office:

40 CFR 261 .....Identification and Listing of Hazardous Waste

40 CFR 262 .....Standards Applicable to Generators of Hazardous Waste

40 CFR 263 .....Standards Applicable to Transporters of Hazardous Waste

40 CFR 761 .....PCB Manufacturing, Processing, Distribution in Commerce, and use Prohibitions

49 CFR 172 .....Hazardous Material tables and Hazardous Material Communications Regulations

49 CFR 173 .....Shippers - General Requirements for Shipments and Packaging

49 CRR 173 .....Subpart A General

49 CFR 173 .....Subpart B Preparation of Hazardous Material for Transportation

49 CFR 173 .....Subpart J Other Regulated Material; Definitions and Preparation

TSCA .....Compliance Program Policy Nos. 6-PCB-6 and 6-PCB-7

1.10 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS

A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract.

B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise

reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

(FAR 52.236-9)

C. Refer to Section 01568, ENVIRONMENTAL PROTECTION, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Alterations", "Restoration", and "Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.

D. Refer to FAR clause 52.236-7, "Permits and Responsibilities," which is included in General Conditions. A National Pollutant Discharge Elimination System (NPDES) permit is required for this project. The Contractor is considered an "operator" under the permit and has extensive responsibility for compliance with permit requirements. VA will make the permit application available at the (appropriate medical center) office. The apparent low bidder, contractor and affected subcontractors shall furnish all information and certifications that are required to comply with the permit process and permit requirements. Many of the permit requirements will be satisfied by completing construction as shown and specified. Some requirements involve the Contractor's method of operations and operations planning and the Contractor is responsible for employing best management practices. The affected activities often include, but are not limited to the following:

- Designating areas for equipment maintenance and repair;
- Providing waste receptacles at convenient locations and provide regular collection of wastes;
- Locating equipment wash down areas on site, and provide appropriate control of wash-waters;
- Providing protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic materials; and
- Providing adequately maintained sanitary facilities.

1.11 RESTORATION

A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the Resident Engineer. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the Resident Engineer before it is disturbed. Materials and workmanship used in restoring work, shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.

B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.

C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on drawings and which are not scheduled for discontinuance or abandonment.

D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2) of Section 01001, GENERAL CONDITIONS.

1.12 PHYSICAL DATA

A. Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

1. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by Contractor and Project Engineer.

B. Subsurface conditions have been developed by core borings and test pits. Logs of subsurface exploration are shown diagrammatically on drawings.

C. Government does not guarantee that other materials will not be encountered nor that proportions, conditions or character of several materials will not vary from those indicated by explorations. Bidders are expected to examine site of work and logs of borings; and, after investigation, decide for themselves character of materials and make their bids accordingly. Upon proper application to Department of Veterans Affairs, bidders will be permitted to make subsurface explorations of their own at site.

1.13 AS-BUILT DRAWINGS

A. The contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, to include all contract changes, modifications and clarifications.

B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the Resident Engineer's review, as often as requested.

C. Contractor shall deliver two approved completed sets of as-built drawings to the Resident Engineer within 15 calendar days after each completed phase and after the acceptance of the project by the Resident Engineer.

D. Paragraphs A, B, & C shall also apply to all shop drawings.

1.14 TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT

A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:

1. Permission to use each unit or system must be given by Resident Engineer. If the equipment is not installed and maintained in accordance with the following provisions, the Resident Engineer will withdraw permission for use of the equipment.
2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor

controllers and their overload elements shall be properly sized, coordinated and adjusted. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.

3. Units shall be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
4. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze-up damage.
5. The air filtering system utilized shall be that which is designed for the system when complete, and all filter elements shall be replaced at completion of construction and prior to testing and balancing of system.
6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used in temporary service shall be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government. Boilers, pumps, feedwater heaters and auxiliary equipment must be operated as a complete system and be fully maintained by operating personnel. Boiler water must be given complete and continuous chemical treatment.

B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.

C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.

1.15 TEMPORARY USE OF EXISTING ELEVATORS

A. Use of existing elevator for handling building materials and Contractor's personnel will be permitted subject to following provisions:

1. Contractor makes all arrangements with the Resident Engineer for use of elevators. The Project Engineer will ascertain that elevators are in proper condition.

2. Contractor covers and provides maximum protection of following elevator components:
    a. Entrance jambs, heads soffits and threshold plates.
    b. Entrance columns, canopy, return panels and inside surfaces of car enclosure walls.
    c. Finish flooring.

1.16 AVAILABILITY AND USE OF UTILITY SERVICES

A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The amount to be paid by the Contractor for chargeable electrical services shall be the prevailing rates charged to the Government. The Contractor shall carefully conserve any utilities furnished without charge.

1.17 TESTS

A. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.

B. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.

C. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire complex which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a complex which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feedwater, condensate and other related components.

D. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.

E. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

1.18 INSTRUCTIONS

A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.

B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the Resident Engineer coincidental with the delivery of the equipment to the job site. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.

C. Instructions: Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system, shall be given in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be

available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the Resident Engineer and shall be considered concluded only when the Resident Engineer is satisfied in regard to complete and thorough coverage. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the Resident Engineer, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.19 RELOCATED EQUIPMENT

A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment and items indicated by symbol "R" or otherwise shown to be relocated by the Contractor.

B. Perform relocation of such equipment or items at such times and in such a manner as directed by the Resident Engineer.

C. Suitably cap existing service lines, such as steam, condensate return, water, drain, gas, air, vacuum and/or electrical, whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".

D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.

E. All service lines such as noted above for relocated equipment shall be in place at point of relocation ready for use before any existing equipment is disconnected. Make relocated existing equipment ready for operation or use immediately after reinstallation.

1.20 STORAGE SPACE FOR DEPARTMENT OF VETERANS AFFAIRS EQUIPMENT

1. Provide such space with adequate light, ventilation and heat in season and lock for adequate security. Contractor shall also install and connect portion of nearest specified fire protection system including all apparatus for instant use to provide water for adequate fire protection of storage space.

2. Storage space shall be turned over to Contracting Officer ninety days prior to Completion Date of the buildings involved.
3. Forward two sets of drawings to Contracting Officer through the Resident Engineer 120 days prior to Completion Date of building; drawings shall indicate those areas which will be made available to Department of Veterans Affairs for temporary storage.

B. "Completion Date" shall mean that date as established by Contracting Officer upon which Contractor will turn over entire project or portions thereof to the Government.

1.21 HISTORIC PRESERVATION

Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately notify the Resident Engineer verbally, and then with a written follow up.

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SECTION 01340
SAMPLES AND SHOP DRAWINGS

1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in Section, GENERAL CONDITIONS.

1-2. For the purposes of this contract, samples, test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.

1-3. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:

A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;
B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.

1-4. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals will not serve as a basis for extending contract time for completion.

1-5. Submittals will be reviewed for compliance with contract requirements by Architect-Engineer, and action thereon will be taken by Project Engineer on behalf of the Contracting Officer.

1-6. Upon receipt of submittals, Contracting Officer will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.

1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefor by Contracting Officer, adjustment in contract price

and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.

1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and Project-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect- Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.

1-9. Submittals must be submitted by Contractor only and shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.

A. Submit samples required by Section 09050, INTERIOR/EXTERIOR FINISHES, MATERIALS, AND FINISH SCHEDULE, in quadruplicate. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.

B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail FAX and shall contain the list of items, name of Medical Center, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.

1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Medical Center, name of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.
3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.

C. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be

marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.

D. Approved samples will be kept on file by the Resident Engineer at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.

E. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.

1. For each drawing required, submit one legible photographic paper or vellum reproducible.
2. Reproducible shall be full size.
3. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
7. When work is directly related and involves more than one trade, shop drawings shall be submitted to Project-Engineer under one cover.

1-10. Samples shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to

_____

(Architect-Engineer)

_____

(A/E P.O. Address)

_____

(City, State and Zip Code)

1-11. At the time of transmittal to the Architect-Engineer, the Contractor shall also send a copy of the complete submittal directly to the Project Engineer.

1-12. Samples for approval shall be sent to Architect-Engineer, in care of Project Engineer, VA Medical Center,

_____

(P.O. Address)

_____

(City, State and Zip Code)

- - - E N D - - -

VAMC KERRVILLE, TX

PROJECT #671A4-07-111ES

BUILDING #11 ELEVATORS E1 AND E2

SECTION 14225

MODERNIZATION OF TRACTION ELEVATORS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section of the specification is intended to cover the complete furnishing of all labor, materials, supervision, engineering, and components on elevators located in Building #11. The elevators included in the specification are the existing elevators E1 and E2.

1.2 SCOPE OF WORK

A. Elevators shall retain existing machine beams, main and counterweight rails, buffers, counterweights, entrance frames, sills, hanger supports, strut angles, fascia plates, slings, platforms, cabs, hoistway doors.

B. Replace Hoist Machine, Motor, Hoist Ropes, Governor, Governor Rope, Controller, Shunt Trip Breaker, Top of Car equipment, Door Operator, Car Doors, Hall Fixtures, Main and Aux. Car operating panels, Cab ceiling, Walls and Flooring.

1.3 ELEVATOR SERVICE

A. One elevator may be removed from service at any one time, unless prior arrangement is made with Contracting Officer and/or Contracting Officer’s Technical Representative (COTR), to permit performance of work. All work on elevator vacated shall be completed, put into satisfactory operation, and temporarily accepted before work on any other elevator can start. Prior to each temporary acceptance, contractors shall complete all pertinent safety tests and inspections. Final inspection and tests shall be given only when all work on all elevators has been completed. Final acceptance shall be given only upon successful completion of final inspection and tests. Premises shall be occupied during performance of work, but Contractor shall have uninterrupted use of scheduled elevator vacated for completion of work.

B. When more than one elevator must be removed from service for cross connection of hall pushbuttons or interface of dispatching controls, contractor shall perform this work after 6:00 PM and before 6:30 AM. The Contracting Officer and/or Contracting Officer’s Technical Representative shall be notified ten (10) calendar days in advance of this work.

1.4 WORK SCHEDULE

Before work is started, submit prepared work schedule for approval and arrange with COTR sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways and elevators, location of temporary partitions, etc. The COTR must be notified twenty (20) calendar days, in writing, in advance of starting work on elevators. No work may begin on any elevator until all materials for that elevator have been delivered to the site and verified by the Contracting Officer and/or Contracting Officer’s Technical Representative. The phasing of work on the elevators shall be coordinated with the Contracting Officer and/or the Contracting Officer’s Technical Representative.

1.5 SAFETY PRECAUTIONS

A. Building will be occupied during execution of work. Work shall be conducted in a manner to afford maximum protection of building, facilities, patients, employees and the public and to prevent unreasonable delay or interference with normal functioning of hospital activities.

B. Where adjacent car is in operation, isolate elevators from each other by suitable barriers between them, extending from pit floor to bottom of secondary slab at top of hoistway, while work is in progress. Remove partition when work is completed.

C. Provide fire extinguishers so that they shall be readily available at all times.

D. It shall be the obligation of the Contractor to maintain a free and clear passageway in each elevator lobby. Parts, tools, etc. shall be kept within the confines of entrance partitions. Trash and debris shall be removed daily.

1.6 REMOVED MATERIALS AND EQUIPMENT

A. Materials that are required to be removed and not specified to be reused or retained under contract shall be removed daily from the site at the expense of the Contractor. Contractor shall receive title to all materials and equipment required to be removed and not specified to be reused or retained, as of date of withdrawal of material from service by Contractor to complete required and scheduled work. Government does not warrant condition of said material to which Contractor shall obtain title, nor shall Government be liable for damage before or after title passes to Contractor.

1.7 APPLICABLE PUBLICATIONS

A. The following specifications and standards of the issues listed below (including the amendments, addenda, and errata designated) form a part of this specification to the extent indicated by the reference thereto. In text, such specifications and standards are referred to by basic number or designation only.

B. Federal Specifications (Fed. Spec.):

J-C-30B(l) Cable and Wire: Electrical (Power, Fixed Installation).

W-C-596A(2) Connector, Plug, Electrical; Connector, Receptacle, Electrical.

W-F-406E Fittings for Cable, Power, Electrical & Conduit, Metal, Flexible.

W-F-408E Fittings for Conduit, Metal, Rigid, (Thick-Wall & Thin Wall (EMT) Type).

ABSI/UL 797 Conduit, Metal, Rigid: Electrical, Thin-wall Steel Type (Electrical Metallic Tubing): Straight Lengths, Elbows & Bends.

WW-C-566C Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Zinc-coated.

1. GAUGES: Sheet and Plate: U.S. Standard Wire: American wire Gauge(AWG).
2. Dl.1-72: American Welding Society (AWS).
3. IEEE: Institute of Electrical and Electronic Engineers.
4. NEMA: National Electric Manufacturers Association.
5. NFPA No. 252: Fire Tests of Door Assemblies.

C. The following standards and codes of the issues listed below (including the latest amendments, addenda, and errata) form a part of this specification:

1. A17.1: 2007 American National Standards Institute (ANSI/ASME) Standards: Safety Code for Elevators and Escalators. In text, publication will be referred to as the Code.

2. A17.2: 2004 American National Standards Institute (ANSI) Standards: Practice for the Inspection of Elevators, Escalators and Moving Walks, Inspector's Manual.

3. NFPA No. 70: (Latest version) National Electrical Code. In text, the Code will be referred to as NEC.

4. Uniform Federal Accessibility Standards & VA Supplement to uniform Federal Accessibility Standards, 1988.

5. Americans with Disabilities Act, Latest edition with supplements.

6. NFPA 2009 Life Safety Code.

1.8 QUALIFICATIONS

A. Approval by the Contracting Officer is required of products or services of proposed manufacturer, suppliers and installers and will be contingent upon submission by Contractor of a certificate stating the following:

1. Elevator contractor is currently and regularly engaged in modernization of elevator equipment as one of his principal products.

2. Installer has technical qualifications of at least five years of successful experience, trained supervisory and installation personnel, and facilities to install and/or modernize elevator equipment specified herein.

3. Proposed Contractor shall submit a list of two or more prior hospital installations where all the elevator equipment he proposes to furnish on this project has performed satisfactorily together under conditions of normal use. The list shall include projects that have been in operation for a period of not less than two years proceeding the date of these specifications; include the names and addresses of the Medical Center and the names of the Medical Center Administrators.

B. Approval of elevator contractor’s equipment will be contingent upon his being able to provide a permanent and satisfactory maintenance service branch which shall render services within two hours of receipt of notification. Elevator contractor shall submit the names and addresses of his authorized branch or service department which will render service to this installation, together with certification that the quantity and quality of replacement parts stock on hand is sufficient to guarantee continued operation of the elevator installation.

C. Elevator equipment shall operate with maximum noise level no more than 80 decibels. They shall be sufficiently quiet so that they will not create objectionable noises in the car and hoistway, or create a disturbance to occupants on the various floors adjacent to the hoistway and machine room. The COTR reserves the right to reject equipment and installations which are, in their opinion, not sufficiently quiet under all operating conditions.

1.9 WIRING DIAGRAMS

A. Provide three complete sets of field wiring and straight line wiring diagrams showing all electrical circuits in the hoistway, as well as the machine room. Install one set framed under glass or on pivoted hard boards coated with an approved plastic sealer and mounted in the elevator machine room as directed by the COTR. In the event field modifications are found necessary during installation, diagrams shall be revised to include all corrections made prior to and-during the final inspection. Corrected diagrams shall be delivered to the Engineering Officer within 30 days of final acceptance.

B. The following information relating to the specific type of microprocessor controls installed on this project shall be provided:

1. Owner’s information manual, containing general data on major components maintenance and adjustment.

2. System logic description.

3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and/or replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.

4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

1.10 ADDITIONAL EQUIPMENT

A. Additional equipment required to operate specified equipment manufactured and contemplated for this installation shall be furnished and installed. The cost of such equipment shall be included in the base bid.

1.11 SAMPLES AND DESCRIPTIVE DATA

A. Materials shall be submitted singularly and separately and apart from materials specified under other Sections and shall be marked “SUBMITTED UNDER SECTION 14226,” in accordance with provisions of SECTION 01340, SAMPLES AND SHOP DRAWINGS. All submitted drawings and related elevator material shall be forwarded to South Texas Veterans Health Care System, Facilities Management room #138, 7400 Merton Minter Blvd., San Antonio, TX 78229, to the attention of Jeff Moore in order to perform a concurrent review.

B. Before executing any work, furnish information sufficient to evidence full compliance with contract requirements on proposed items. Such information shall include, as required: Manufacturer’s Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity and rating) and corresponding specification references (Federal or project specification number and paragraph).

C. Name of manufacturer, type or style designation and applicable data of the following equipment shall be shown on the elevator layouts:

1. Controllers

2. Selector/Leveling unit

3. Solid state motor control (AC DRIVE)

4. Electric door operator; HP. rating and RPM. of the motor

5. Auto dial phone system

6. Audio voice system

7. Hoist rope gripper

8. Machine room computer system

9. Top of car run button.

D. Shop Drawings:

1. Cuts or drawings and description of power door operator.

2. Cuts or drawings showing details of all signal and car equipment fixtures.

3. Furnish certificates as required under paragraph “Qualifications”.

4. Car operating panels.

5. New AC hoist motors and machines.

1.12 PERFORMANCE STANDARDS

A. The elevators shall be capable of meeting the highest standards of the industry and specifically the following.

B. Contract speed shall mean speed in the UP direction with full capacity load in the car. Speed variation under any load condition, regardless of direction, shall be no more than 5 percent.

C. The controlled rate of change of acceleration and retardation of the car shall not exceed O.lG per second and the maximum acceleration and retardation shall not exceed 0.2G per second.

D. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration. Stopping shall be without bumps or jars.

E. Full speed running shall be quiet and free from vibration and swaying. When cars are standing at the floor with doors open, they shall remain firmly stopped and shall not rock side to side.

F. Rope stretch recovery shall be provided to re-level cars at a floor, if the ropes slightly stretch.

G. Cars shall not move from side to side during the process of opening and closing the doors.

H. Elevator control systems shall be capable of starting the car without noticeable "roll-back" of hoistway machine sheave, regardless of load condition in car, location of car, or direction of travel.

1.13 TOLERANCES

A. Floor Accuracy:

1. Leveling control systems, 1/8 inch above or below the floor.

1.14 GUARANTEE

A. The modernized elevator systems shall be guaranteed beginning with the completion and acceptance of the last elevator installation by the COTR. It shall be subject to terms of "GUARANTEE" articles of Section GENERAL CONDITIONS (except for length of guarantee). Upon receipt of notice from the Government of failure of any portion of materials and workmanship furnished, affected part or parts shall be replaced promptly with new parts by and at the expense of the contractor. The guarantee period shall concur with the length of the maintenance contract.

B. No device will be acceptable that will not give perfect satisfaction without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with specification requirements, or if in the opinion of the COTR, excessive maintenance and attention must be employed to keep device operating, device shall be installed as part of work until satisfactory operation of installation is obtained. Period of guarantee shall start anew from date of completion of new installation performed in accordance with foregoing requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Where stainless steel is specified, it shall be corrosion resisting steel complying with Fed. Spec. QQ-S-766, Class 302 or 304, Condition A with Number 4 finish (150 grit) on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and all

surfaces shall be perfectly smooth and without waves. During erection, all stainless steel surfaces shall be protected by suitable material.

2.2 MANUFACTURED PRODUCTS

A. Materials, devices and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. Items not meeting this requirement, but which otherwise meet technical specifications and the merits of which can be established through reliable test reports or physical examination of representative samples, will be considered.

B. When two or more units of same class of materials, devices or equipment are required, these units shall be products of one manufacturer.

C. Manufactures of equipment assembles which include components made by others shall assume complete responsibility for the final assembled unit.

1. All components of an assembled unit shall be products of the same manufacturer.

2. Parts that are alike shall be the product of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for the intended service.

D. If the elevator equipment to be installed is not known to the COTR, the Elevator Contractor shall submit drawings in triplicate (2 prints and 1 sepia), for approval, showing all details or demonstrate to the satisfaction of the COTR that the equipment to be installed is in strict accordance to the Specifications.

E. Welding at the project site shall be made by welders and welding operators who have previously qualified by test as prescribed in American Welding Society Publications AWS Dl.1 to perform type of work required. VAMC shall require welding certificates be submitted for all workers employed in this capacity. A burning permit is required before any burning or welding is done.

F. Motor nameplates shall state rated horsepower, speed, volts, amperes and other characteristics required by NEMA Standards and shall be securely attached to the item of equipment in a conspicuous location.

G. The elevator equipment, including controllers, selectors, door operators, relay panels, leveling units, and supervisory system, shall be the product of one manufacturer of established reputation, except that any of the above items may be the products, either wholly or in part, of any manufacturer of established reputation provided such items are capably engineered and produced under coordinated specifications to ensure a first class, safe and smooth operating system.

H. Where key operated switches are furnished in conjunction with any component of this elevator installation, furnish four keys for each individual switch or lock. Do not provide “barrel” type keys. Provide standard MEDCO R63A to match existing keys. Attach each key to a tag bearing a stamped or etched legend identifying its purpose. Engrave tags and imprint “Property of U.S. Government” on reverse side.

2.3 CAPACITY, SPEED, TRAVEL, ETC.

A. Each elevator shall have the capacity to lift a live load (exclusive of the weight of the car and ropes) at the speed in feet per minute as specified in the following schedule: #E1 & E2, Capacity 4000 lbs., Speed 350 fpm., Floors Served B,1-7, Stops 8, Openings 8 Total travel 83 feet 5 inches.

B. Total travel is approximate and must be verified in the field by the Contractor.

C. Rated speed shall mean speed in either direction of travel with rated capacity load in car. Actual speed, under any load condition shall not vary more than five percent of rated speed.

2.4 POWER SUPPLY

A. Power for emergency operation of elevators specified will be available from emergency power feeders and transfer switch.

B. Elevator contractor shall reuse existing shunt trip breakers located in elevator machine room.

2.5 AUXILIARY POWER OPERATION: REUSE

A. The control system for elevators shall include provisions for normal power operation on auxiliary power upon failure of the supply.

B. Auxiliary power supply including its starting means and the transfer switch for transfer of power supply from normal to auxiliary is shall be reused.

C. Upon loss of normal power supply and returning to normal power, there shall be a delay before transferring to auxiliary power. The delay shall be accomplished through an adjustable timing device capable of delays from zero seconds to sixty seconds.

2.6 GROUNDING

A. Equipment grounding shall be provided. Ground conductors, supports, controller enclosure, motors, platform and car frames and other noncurrent conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, insulated and sized as required by NEC. Bond the grounding wires to each pull boxes, junction boxes, cabinets and other enclosures through which the wires pass.

2.7 CONDUIT, WIREWAY (DUCT)

A. Existing conduit that conforms to NEC may be reused. New conduit shall comply with the following paragraphs.

B. Unless otherwise specified or approved, install electrical conductors, except traveling cable connections to the car, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Where permitted by NEC, 1/2-inch trade size conduits and EMT may be used only for tap connections to interlocks, emergency exits and leveling units. All raceways completely embedded in concrete slabs, walls, or floor fill shall be rigid steel conduit. No rigid conduit or electrical metallic tubing shall be smaller than 3/4-inch electrical trade size. An auxiliary gutter may be used between controller, starter, and similar apparatus in the elevator machine room. Fully protect self-supporting connections, where approved, from abrasion or other mechanical injury. Flexible metal conduit not less than 3/8 inch electrical trade size may be used, not exceeding 18 inches in length, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC. Flexible heavy-duty service cord, type S.O., may be used between fixed car wiring and switches on car doors for infrared curtain units.

C. All conduit terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have approved insulation bushing. Install a steel lock nut under the bushing if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.

D. Conduit and EMT fittings and connectors using set screws or indentations as a means of attachment shall not be used.

E. Connect motors or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits. Certain existing conduits and ducts may be reused if they are code conforming and prior agreement is received from the COTR.

2.8 CONDUCTORS: EXISTING TO BE REMOVED

A. Unless otherwise specified, conductors, exclusive of traveling cables, shall be stranded or solid coated annealed copper in accordance with Federal Spec. J-C-30 for either type RHW or THW. Where 16 and 18 AWG are permitted by NEC, either single conductor cable in accordance with Federal Spec. J-C-580 for type TF or multiconductor cable may be used, provided the insulation of single conductor cable may be, and outer jacket of multiconductor cable is, flame retardant and moisture resistant. Multiconductor cable shall have color coding or other suitable identification for each conductor. Conductors for control board wiring, including wiring between main circuit resistors and control boards, shall be in accordance with NEC. No joints or splices will be permitted in wiring, except as outlets. Tap connectors may be used in wireways provided they meet all UL requirements.

B. All wiring must test free from short circuits or grounds. Insulation resistance between individual external conductors and between conductors and ground shall be not less than one megohm.

C. Where size of conductors is not given, capacity shall be such that maximum current shall not exceed limits prescribed by NEC.

D. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors. The contractor may at his option make these terminal connections on No. 10 or small conductors with approved terminal eyelets set on the conductor with a special setting tool or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

2.9 TRAVELING CABLES: EXISTING TO BE REMOVED

A. All conductors to the car shall consist of flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on top of the car directly to controller. Junction boxes on car shall be equipped with terminal blocks. Terminal blocks having pressure wire connectors of the clamp type that meet UL 486A requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks shall have permanent indelible identifying number for each connection. Cable shall be securely anchored to avoid strain on individual terminal connections. Outer covering must remain intact between junction boxes. Abrupt bending, twisting and/or distortion of the cables shall not be permitted.

B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than four spare conductors in each traveling cable.

C. Provide shielded coaxial conductors for the auto dial system within the traveling cable or provide a separate cable for the auto dial system.

D. If, due to sway or change in relative position of traveling cables, complete freedom from contact with the hoistway or elevator construction cannot be obtained, shields, pads, or hardware cloth shall be provided on the elevator of hoistway structure wherever necessary to prevent damage to the traveling cables.

E. Car lighting circuits shall be connected to the auxiliary/emergency power panel.

F. Run traveling cable from car to machine room. Do not use half way box.

2.10 CONTROLLERS, STARTERS, RELAY PANELS, SUPERVISORY PANELS, SELECTORS and GENERATORS: EXISTING TO BE REMOVED

A. All controllers required for the control, dispatching, signals and door operations of the system shall be in accordance with the requirements of this paragraph.

B. All controller assemblies shall provide efficient, smooth and practically stepless acceleration and deceleration of the elevator hoisting machine, automatically and independently of the load in the car. The panel material shall be self-extinguishing, having a flame resistance that meet the requirements of either flammability test method 2021 or 2023, or Federal Test Method Standard No. 406.

C. All switches, relays and other components shall be mounted on the front of controller, starter, relay and selector panels. All wiring connections for controller components, resistors in excess of 30-watt capacity and transformers shall be mounted within enclosure. All controller wiring shall be neatly formed, laced and securely fastened in place.

D. If swing panel construction is used for any controller components, details shall be submitted for approval.

E. Wiring of the various external control and operating circuits shall be brought to a terminal board in the controller from where it shall continue to the various switches, solenoids and other devices on the panel. Connections of wires to terminals from external circuits shall be made with metal eyelets, solderless lugs or similar connectors. Starting and accelerating resistance shall be constructed of resistance wire or cast iron grids insulated with mica or other approved material and mounted to give constant pressure at all temperatures. If wire resistance is used, the material shall be capable of withstanding frequent heating and cooling cycles without excessive oxidation or crystallization and shall not be affected by atmospheric conditions. Resistance in connections with solenoids, etc., shall be wire, wound on noncombustible forms of insulating material and mounted so as to be readily renewable.

F. Equipment shall be provided to protect the driving motor against overload and single phasing in all three (3) phases of the delta connection, protect the control equipment against overload and phase reversal.

G. Where time delay relays are used in the circuits, they shall be of an acceptable design that is reliable and consistent, such as condenser timing or electronic timing circuits. No dash pot time relays shall be used.

H. Each device on all panels shall be properly identified by name, letter or standard symbol which shall be neatly stencil painted (or otherwise marked), in an indelible and legible manner, on device or panel. Identification markings shall be coordinated with identical markings used on wiring diagrams. The ampere rating shall be marked adjacent to all fuse holders. All spare conductors to controllers, selectors and relay panels shall be neatly formed, laced and identified.

I. Safety switch shall cut off current automatically apply brake and stop car upon current failure and/or upon operation of any electrical safety device.

2.11 MICROPROCESSOR CONTROL SYSTEM

A. Provide solid state components and printed circuit boards to control the hoisting machine and signal functions in accordance with these specifications. Complete details of the components and printed circuit boards, together with a

complete operational description, shall be submitted for approval. All controllers shall be non-proprietary and no special tool, including a hand held testing tool shall be necessary for adjustments or maintenance. The controller vendor shall be able to provide immediate tech support and be able to overnight mail any parts necessary for maintenance.

B. All controller assemblies shall provide efficient, smooth, stepless acceleration and deceleration of the elevator hoisting machine, automatically and irrespective of the load in the car. All control equipment shall be enclosed in a metal cabinet with lockable, hinged door(s) and shall be provided with a means of ventilation. All non-conducting metal parts in the machine room shall be grounded in accordance with NEC. Cabinet shall be securely attached to the building structure.

C. Modules for the control of each elevator system, including dispatching, signals, door operation and special operation, shall be installed in a NEMA, Type 1, General Purpose Enclosure. Circuit boards shall be moisture-resistant, be non-corrosive, be nonconductive, be fabricated of noncombustible material and be of adequate thickness to support the components mounted thereon.

D. Each device, module and fuse (with ampere rating) shall be identified by name, letter or standard symbol in an approved indelible and legible manner on the device or panel. Coordinate identification markings with identical markings on wiring diagrams.

E. The electrical connections between the printed circuit boards (modules) and the circuit connectors incorporated in the mounting racks shall be made through individual tabs which shall be an integral part of each module. The tabs shall be nickel-gold plated (or of other approved metal or equal electrical characteristics). Modules shall be keyed or notched so as to prevent insertion of the modules in the inverted position.

F. Light emitting diodes (LEDS) shall be for visual monitoring of individual modules.

G. Components shall have interlocking circuits to assure fail-safe operation and to prevent unwarranted elevator movement should any component fail to function properly.

H. Method of wire wrapping for point to point with connections on the mounting racks shall be submitted for approval.

I. Modules shall be of the type that plug into pre-wired mounting racks. Field wiring or alternation shall not be necessary in order to replace defective modules.

J. Field wiring changes required during construction shall be made only to the mounting rack connection points and not to the individual module circuitry or components. If it becomes necessary to alter individual modules, they shall be returned to the factory where such design changes shall be made and module design records changes so that correct replacement units shall be available.

K. Module boards shall be fabricated from nonconductive, non-corrosive material and shall be of sufficient strength so as to support all components mounted thereon without warping. Mounting racks shall be spaced sufficiently apart to prevent accidental contact between individual modules.

L. All logic symbols and circuitry designations shall be in accordance with ASME Standards.

M. Solid state components shall be designed to operate within a temperature range of 30 degrees F to 104 degrees F. No temperature controller or air-conditioned rooms shall be required for proper operation of solid state components.

N. Wiring connections for operating circuits and for external control circuits shall be brought to terminal blocks mounted in an accessible location within the controller cabinet. Terminal blocks using pierce through serrated washers shall not be acceptable.

2.12 VARIABLE VOLTAGE VARIABLE FREQUENCY (VVVF)

A. Solid State Motor Control:

1. Elevator control shall be affected by means of a compact solid state motor control unit for each elevator with electrical characteristics to suit the power supply. The system shall consist of the necessary three phase, full-wave bridge rectifiers and be fully regenerative.

2. Solid state motor control unit shall operate with high efficiency and low power consumption, have sufficient capacity to handle peak currents typical of elevator service and contain a balanced, coordinated fault protection system which shall accomplish not less than the following:

a. Protect the complete power circuit and specifically the power semi-conductors from failure under short circuit (bolted fault) conditions.

b. Protect against limited faults arising from partial grounds, partial shorts in the motor armature or in the power unit itself.

c. Protect the drive motor against sustained overloads. A solid state overload circuit shall be used.

d. Protect motor and power unit against instantaneous peak overload.

e. Provide semi-conductor transient protection.

f. Provide phase sequence protection to insure incoming line is phased properly.

g. Removable printed circuit cards shall be provided for the AC control, designed so the tabs cannot be reversed.

2.13 GEARED TRACTION AC HOIST MACHINES: NEW

A. Geared traction machines to meet ASME A17.1 Elevator Code.

B. The geared traction machine shall be of the single worm and gear, single wrap traction type with motor, brake, worm gear housing, and sheave pedestals mounted in rigid bedplate.

C. Hoisting motor of geared traction machine shall be designed to develop the required high starting torque with a low starting current and shall conform to the NEMA Standards for 50 degree C, sixty minute rated elevator hoisting motor.

D. Provide disc type brakes.

E. Vibration isolating machine foundation and pads shall be furnished for machines mounted over hoistway.

2.14 SHEAVES

A. Retain deflector sheaves for elevators P1 and P2.

B. Clean and check for wear.

C. Reuse guards on sheaves.

2.15 MACHINE BEAMS - RETAIN EXISTING

2.16 CAR AND COUNTERWEIGHT GUIDE RAILS

A. Retain existing car and counterweight guide rails and brackets.

B. Thoroughly clean all guide rails of grease, oil, rust and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car and counterweight.

C. Provide any required rail backing and/or intermediate tie brackets to comply with ASME Code for bracket spacing for both car and counterweight rails.

2.17 ROLLER GUIDES FOR CAR AND COUNTERWEIGHT

A. Provide car and counterweight with new roller guides.

B. Each guide shall be and approved type consisting of 3 six inch wheels for car and 3 three inch wheels for counterweight, each with durable, resilient oil resistant material with tires rotating ball bearings sealed in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. The wheels shall be ample diameter and shall run on three machined rail surfaces. Secure the roller guides on top and bottom of car and counterweight. All mounting bolts shall be fitted with nuts, flat washers, split lock washers and if required, beveled washers.

2.18 CAR AND COUNTERWEIGHT BUFFERS: REUSE EXISTING

A. Reuse existing spring buffers. Clean and paint.

2.19 COUNTERWEIGHTS: EXISTING TO BE RETAINED.

A. The counterweights shall be cleaned and all missing or damaged bolts, tie rods, frames and members shall be replaced.

B. Subweights shall be added to or removed from the counterweights frame to provide a counterbalance equal to the weight of the complete car and approximately 40 percent of the rated capacity. New subweight shall be sectional cast iron, flame cut hot rolled steel or cast lead. Test for this balance shall be witnessed in the presence of and as directed by the COTR.

C. Reuse existing counterweight guards.

2.20 HOISTING ROPES: REPLACE EXISTING

A. Replace existing hoisting ropes on elevators.

1. Ropes to meet ASME A17.1 Code

2. Contractor to replace with wedge type shackles.

2.21 GOVERNOR ROPE: NEW

A. New governor rope shall be 6 x 19 or 8 x19 wire rope, iron or traction steel.

B. Under normal operation, rope shall run free and clear of governor jaws, rope guards and other stationary parts.

C. Governor Rope tag shall be securely attached to governor rope releasing carrier. Data tag shall be corrosion-resistant metal and shall bear data as required by the Code.

2.22 SAFETY DEVICE

A. Reuse existing car safety device.

B. Clean safety devices, readjust to comply with current requirements of the code.

C. Field test of car safety and governor shall be as specified in the Section entitled "TESTS" of these specifications.

2.23 OVERSPEEED GOVERNOR

A. Replace existing governors with new centrifugal type with over speed and speed reducing switches.

B. The governor rope clamping device shall be adjusted so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the safety. The grip jaws shall be of such shape and length that pull-through action of the governor rope, as required by Code, will result in a minimum amount of rope abrasion.

C. No field painting of governor parts shall be permitted.

D. Install new governor pit tail sheaves.

2.24 ASCENDING CAR OVERSPEED DEVICE

A. Provide hoist rope gripper device as per ASME A17.1 Elevator Code to stop elevator in up direction when elevator is speeding in the up direction.

2.25 NORMAL AND FINAL TERMINAL STOPPING DEVICES: NEW

A. Normal and final terminal stopping devices shall conform to the Code.

B. Mount normal stopping switch on car or in hoistway to slow speed of car and bring it to an automatic stop level with the terminal landings.

1. Switch shall function with any load up to and including 125 percent of rated elevator capacity at any speed obtained in normal operation.

2. Switch, when opened, shall permit operation of car in reverse direction.

3. No normal stopping device, other than one mounted on car and activated by cams in hoistway, or mounted in hoistway and activated by cams on car, shall be permitted.

C. Mount final terminal stopping switches in the hoistway.

1. Switches shall be positively opened by car should the car travel beyond the normal stopping switches.

2. Switches, when opened, shall remove power from hoist motor, apply hoist machine brake and prevent operation of car in either direction.

2.26 WORKMAN'S LIGHTS AND OUTLETS: NEW

A. Provide lamps with wire guards on top of each elevator car and beneath the platform.

2.27 TOP-OF-THE CAR OPERATING DEVICE: NEW

A. The device shall conform to ASME A17.1.

B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked "“INSPECTION” and "NORMAL" on the faceplate, with 1/4-inch letters.

C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and a safety button.

D. Provide emergency stop toggle type switch as specified in ASME A17.1.

E. Provide permanent identification for the operation of all components in the device.

F. The device shall be permanently attached to the elevator crosshead on the side of the elevator which is nearest to the hoistway doors.

2.28 CAR LEVELING DEVICE: EXISTING TO BE REMOVED

A. Car shall be equipped with a two-way leveling device to automatically bring the car to within 1/8 inch of exact level with landing for which a stop is initiated regardless of load in car or direction of travel.

B. Car shall, at all times, level into the floor and shall not stop above or below the floor and level back.

C. The automatic leveling device shall, within its zone, be entirely independent of the operating device and if the car stops short or travels beyond the floor, the leveling device shall automatically correct this condition and maintain the car within plus or minus 1/8 inch of level with the floor landing regardless of the load carried and its stretching effect on the cables during loading and unloading.

D. A car leveling device functioning through the medium of vacuum tubes or photoelectric tubes or optic type is not acceptable. Approved permanent magnet, electromagnetic, encoder, or selector type leveling is required.

2.29 EMERGENCY STOP SWITCHES

A. Emergency stop switches shall conform to the Code.

B. Each stop switch shall be red in color and shall have its "identity" and STOP' and "RUN" positions legibly and indelibly identified.

C. Install new pit switches 4 ft. above lowest landing floor at top of pit ladder. Provide new pit switch in pit, 4 ft. above pit floor.

2.30 OPERATING DEVICE FACEPLATES: NEW

A. Fabricate faceplates for all elevator operating and signal devices from not less than 1/8-inch thick flat stainless steel. Install all faceplates flush with surface upon which they are mounted.

B. New corridor pushbutton faceplates shall be the same size or larger as existing faceplates.

C. Fasten all car and corridor operating device and signal device faceplates with non-corrosive white metal spanner head or Bristol head tamperproof screws.

D. Design car and corridor push-button faceplates so that pressure on pushbuttons shall be independent of pressure on pushbutton contacts.

E. Engraved legends in faceplates shall have lettering 1/4-inch high filled with black paint.

F. Provide Braille on pushbutton faceplates.

2.31 OPERATING DEVICES AT HOISTWAY LANDINGS: EXISTING TO BE REMOVED

A. Provide new landing call buttons. May reuse in existing push button boxes if centerline of new plates is 42 inches

B. Fixtures for intermediate landings shall contain "UP' and "DOWN" buttons. Fixtures for terminal landings shall contain a single "UP" or "DOWN" button.

C. The direction of each button shall be legibly and indelibly identified by arrows not less than 1/2 inch high in the face of each button.

D. Each button shall contain an integral registration light which shall illuminate upon registration of a call and shall extinguish when the call is answered. Install LED type light bulbs, white in color, in hall push buttons.

E. If a landing button is operated while the car and hoistway doors are closing at that floor, the call shall be registered for the next elevator. Calls so registered shall be canceled if closing doors are re-opened by means of "DOOR OPEN" button, or infrared curtain unit.

2.32 ELEVATOR CAR OPERATING PANEL: EXISTING TO BE REMOVED

A. New main car operating panels shall be located in the front wall panel of the car enclosure. It shall be positioned such that top passenger use device floor button shall be 4 feet above the finished floor. The new faceplate shall be big enough to cover all holes in front return panel (existing emergency light, etc.)

B. All terminology on main car operating panel and auxiliary panel shall be raised or engraved. Use 1/8-inch letters to identify all other devices in upper section of the main car operating panel. The handicapped marking contrasting background shall be recessed .030 inch in a square or rectangular shape, in the faceplate, with the finished face of the 1/2 inch high numeral and Braille markings flush with the finished faceplate. The numerals and markings shall be integrated with the faceplates. Applied plates are unacceptable. Engrave number of elevator, one inch high, in upper part of car panel.

C. Two-section flush panel shall have lower section recessed and fitted with hinged doors. Door of lower section shall have concealed hinges and shall be in same front plane as lower section and shall be fitted with cylinder type, key operated lock. Two-section panel shall have one piece faceplate.

1. The upper section shall contain:

a. A complete set of minimum one-inch diameter LED white illuminated push buttons corresponding to the floors served. Lights shall extinguish when the car or stops at a given floor. Each call button shall be legibly and indelibly identified by floor number not less than 1/2 inch high in the face of each call button.

b. Keyed emergency stop switch (red in color).

c. Emergency signal alarm bell button (red in color) conspicuously located to minimize accidental activation.

d. Two-position, key-operated INDEPENDENT SERVICE transfer switch marked "INDEPENDENT SERVICE" with two positions marked "OFF" and "ON".

e. The three position, key-operated FIRE SERVICE switch marked "FIRE SERVICE" with three positions marked "OFF", "HOLD" and "ON". Adjacent to the FIRE SERVICE switch, provide a series of vertical lines engraved and filled with red translucent material or fire hat which shall illuminate when required on FIRE SERVICE operation.

f. Engrave fire service operation signage on car operating panel.

g. A buzzer for FIRE SERVICE operation.

h. Door "OPEN" and door "CLOSE" buttons located below the car buttons. The door "OPEN" button shall be located adjacent to the car door entrance column.

i. Provide a flashing medical emergency sign on car operating panel when hall medical emergency key switch is activated. Provide medical emergency key switch. Key shall be removable only in the off position.

j. Engrave medical emergency operation signage on front of main car operating panel.

k. An emergency “PUSH TO TALK” button for auto dial system. Engrave “PUSH TO TALK” over button, engraving to be 1/4 inch.

l. Provide a “Door Hold” button on faceplate. It shall have “Door Hold” engraved on button. Button shall light when activated. When activated, the door shall stay open for a maximum of 1 minute. To over ride door hold timer, push car operating panel floor call button.

2. The lower section shall contain:

a. Toggle switch for controlling interior car lighting.

b. Two speed toggle switch (high and low) for controlling car ventilating blower.

c. Two-position toggle inspection switch that will disconnect normal operation, activate hoistway access switches at terminal landings. Switch shall be marked "INSPECTION" with two-positions marked "ON" and "OFF".

d. Two position, spring return toggle switch or push button to test the emergency light and alarm bell. It shall be labeled “Test emergency light and bell”.

3. The emergency stop switch and emergency signal bell button shall be located below the car operating buttons.

a. Red emergency keyed stop switch, when operated, shall interrupt power supply, stop car independently of regular operating device. Car calls shall remain registered and car shall answer them when stop switch is reset. Emergency stop switch markings shall include clear indications for both the "STOP" and "RUN" positions.

b. Emergency signal alarm bell button shall be connected to a six-inch vibrating bell located on top or bottom of car.

c. Submit design of main car panel for approval.

2.33 AUXILIARY CAR OPERATING PANEL

A. Provide an auxiliary car operating in the existing location in side wall panel. The auxiliary car operating panel shall contain only those controls essential to passenger operation.

1. Mount red emergency signal alarm bell button, door “open” and “close” buttons in an easily identifiable group with stop switch and alarm bell button mounted at a point no closer than 35 inches to the finished floor.

2. Complete set of LED illuminated pushbuttons with a minimum diameter of 1 inch. Buttons shall have the floor designations indelibly marked corresponding to the numbers of the main car operating.

3. Cross-connect all buttons in the auxiliary car operating panel to their respective buttons in the main car operating panel. Registration of a car call in either panel shall cause the corresponding button to illuminate in both the main and auxiliary car operating panels.

4. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with non-corrosive Stainless Steel spanner head or Bristol head tamperproof screws.

5. Submit design of auxiliary car operating panel for approval.

6. Install an “Emergency, Push to Talk” button for auto dial system. Engrave “PUSH TO TALK” over button, engraving to be 1/4 inch.

7. Install auto dial phone system in auxiliary car operating panel.

2.34 DUPLEX SELECTIVE COLLECTIVE AUTOMATIC OPERATION

A. Provide duplex selective collective automatic operation for elevators P1 and P2.

B. Design system so that on operation of one or more dispatch buttons within the car, car shall start automatically, providing hoistway door interlock and car door contact circuits have been established and shall stop at the first floor reached for which a call has been registered. Stops shall be made in the natural order in which floors have been reached, irrespective of sequence in which calls have been registered, provided call is registered sufficiently in

advance of arrival of car at that particular floor to permit stop to be made. During this operation the cars shall only respond to calls registered at the landings, but only one car shall respond to any one landing call and it shall be the car nearest to the call which is set to travel in the corresponding direction of the registered call.

C. Arrange the system so that normally one car shall be parked at the main landing and the other car at the last landing served. Both cars shall park with their doors closed. The car parked at the main landing shall be considered the “parked” car and the other car shall be considered the “free” car. Should both cars complete their calls at the main landing, the car which arrived first shall be considered the “free” car. An idle “free” car shall respond to any landing call registered either above or below the floor at which it is standing. When the “free” car is responding to car or landing calls, the “parked” car shall automatically start up in response to an “up” call registered below an “up” traveling “free” car, or “up” or “down call registered above a “down” traveling “free” car. Either car shall respond to their calls. If the “parked” car leaves the main landing for any reason, it shall assume the duties of the “free” car and the “free” car shall proceed upon completion of its calls, to the main landing to become the “parked” car.

D. If a car is taken out of service for any reason, or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40 to 180 seconds, all calls shall be transferred to the other car which shall function as a single car selective collective elevator until the “out of service” car is returned to the system.

E. Provide a time relay which shall hold the car and the hoistway doors open for an adjustable predetermined time to give passengers time to leave or enter the car.

F. A landing car call registered from the landing at which either the “parked” car or “free” car is parked shall automatically open car and hoistway doors. Provide sufficient time delay to allow entering passengers to register a car call and establish direction before that car can respond to other landing calls registered at the same time.

G. If the system has landing calls in registration continuously without interruption for an adjustable predetermined period of 30 to 90 seconds, the “parked” car shall automatically start up to assist the “free” car in answering calls.

2.35 INDEPENDENT SERVICE

A. A two-position key operated "INDEPENDENT SERVICE" switch shall be provided in the main car operating panel which shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls registered on its car dispatch and shall bypass all calls registered on landing push buttons. Car and hoistway doors shall not close until a car button or the "DOOR CLOSE" button is pressed and held until interlock circuits are made up. When switch is returned to "OFF" position, normal service shall be resumed. In addition, the elevator shall be disconnected from the automatic dispatching system and the hall lanterns and the highest call reversal shall not be effective. The other car shall respond to all hall calls.

2.36 MEDICAL EMERGENCY SYSTEM

A. Provisions shall be made for calling passenger elevators 1 and 2 (ONE GROUP) to any floor served by the elevator group on and emergency basis, operating independently from the dispatch signals and LANDING CALL signals. Provide a two-position, key operated, momentary contact, spring return switch at each floor served.

B. Install key switch and medical emergency light mounted in the new floor landing pushbutton fixture box, above the pushbuttons.

C. Landing key switches shall be momentary pressure-spring return to “OFF” position. Provide a call registered light jewel adjacent to key switch, The landing key switch and the “MEDICAL EMERGENCY” key switch in the car shall not be operable for any other purpose in the hospital.

D. When switch is activated at any floor, the call registered light jewel shall illuminate at that floor only, and the elevator group supervisory control system shall instantly select the nearest available elevator in the group service to respond to the medical emergency call. Immediately upon selection, all car calls within that car shall be cancelled. Further, transfer any landing calls which had previously been assigned that car to another car. If the selected car is traveling away from the medical emergency call, it shall slow down and stop at the nearest floor, maintain closed doors, reverse direction and proceed nonstop to the medical emergency call floor. If the selected car is traveling toward the medical emergency call floor, it shall proceed to that floor nonstop unless, at the time of selection, it happened to be slowing down for a stop, in which event the car shall stop, maintain doors closed, and start immediately toward the medical emergency floor.

E. Arriving at the medical emergency floor, the car shall remain with the doors open for an adjustable time interval of 10 to 30 seconds. After this interval has expired and the car has not been placed on medical emergency operation from within the car, the car shall automatically return to normal service.

F. Locate a medical emergency key switch in the upper section of each car operating station for selecting medical emergency service. Activation of the key switch will allow the car to accept a car call for any floor, close doors, and proceed nonstop to the floor desired. The return of the key switch to normal position will restore the car to normal service. Key shall be removable only in the off position.

G. Any car in the duplex group service may be selected. Additional medical emergency calls, as they are registered in the system, shall cause the second car to respond as described below, always on the basis of one medical emergency call per car.

H. Provide in the top section of each car operating panel and in the center of the rear cab panel (approximately 6 ft. above the floor,) back lighted “MEDICAL EMERGENCY” indicators which shall flash on and off continuously when the car is assigned to this operation and until it is restored to normal service. These “MEDICAL EMERGENCY “indicators shall be photographic negative with 1 inch high letters and legible only when illuminated.

I. All of the key switches in the “MEDICAL EMERGENCY SERVICE SYSTEM” for all elevators shall operate from the same key. The medical emergency call service key shall not operate any other key switch in the elevator system, nor shall any other key required by the elevator system be able to operate the medical emergency call service switches.

J. Should all the cars be operating on independent service, the medical emergency service light jewel in the car operating panel shall be illuminated and the buzzer shall sound directing the attendant to return the car to automatic operation.

1. Engrave instructions on the car operating panel for the attendant to follow when the service is activated.

K. Should all cars be out of service and unable to answer emergency call, the call registered light shall not illuminate.

L. Each switch faceplate shall have legible indelible legends engraved or etched to indicate its “IDENTITY” and “POSITIONS”. All letters in faceplate shall be not less than 1/4 inch high, filled with black paint.

M. Fire service elevators on medical service shall remain on medical service and then go back to automatic and return to main or alternate floor.

2.37 FIRE SERVICE: REUSE EXISTING

A. Provide fire service as per the ASME A17.1 Code.

B. Smoke Detectors:

1. Reuse smoke detector devices that are designated for actuation of Elevator Phase 1 “FIRE SERVICE” response in each elevator lobby, top of hoistway, and machine room.

a. Elevator lobby smoke detectors shall activate only the elevators sharing the corresponding or common lobby.

b. Upon activation of an elevator lobby, top of hoistway, or machine room smoke detection device, a signal shall be transmitted to the building fire alarm control console. The “ALARM” signal shall be transmitted from the console to the elevators which shall activate the “FIRE SERVICE PHASE 1” operation. The “ALARM” signal shall be received from any elevator lobby, top of hoistway, or machine room smoke detection device except the device located in the main lobby, shall send the elevator to a designated alternate floor.

c. When an “ALARM” signal initiates Phase 1 operation, momentary movement of the “FIRE SERVICE” key in the lobby control panel to the “BYPASS” position shall be required to return elevators to automatic operation if “ALARM” signal is cleared.

d. Provide new fire service key switch in first floor push button plate.

C. First floor is main floor, second floor is alternate floor.

D. Top of hoistway smoke detector shall have 2 sets of contacts. One set shall be for phase 1 fire service and the second set shall operate the existing top of hoistway motorized louvered venting

2.38 HOISTWAY VENTING

A. Provide motorized hoistway venting located at the top of hoistways on passenger elevators E1 and E2. The venting shall stay closed under power. When the top of hoistway smoke detector is activated, the power is removed from the venting and the venting will open. When the smoke detector is reset, the venting is closed by power.

2.39 SHUNT TRIP CIRCUIT BREAKER

A. Reuse shunt trip circuit breakers in elevator machine room.

B. Reuse heat detectors installed within 24 inches of each sprinkler head in machine room. The heat detectors shall be 135 degree rated compensation heat detectors. Provide wiring from machine room heat detectors to fire alarm panel and back to 110V (AC) switch for each circuit breaker.

C. The heat detectors shall be connected to the fire alarm control panel. When activated by the heat detectors, the fire alarm control panel shall a supervised signal to the elevator machine room in the form of a relay with a set of 110 Volt “C” contacts for each elevator. The 110 Volt circuit is to be on emergency power system. The relay shall be located in the machine room. Power shall be removed from each elevator controller by activating an independently controlled shunt trip circuit when the temperature in the machine room exceeds the setting of the heat detector.

D. The heat detector shall be independent of the fire service system.

2.40 AUDIO VOICE SYSTEM

A. Provide voice audio activated by stopping or passing a floor. Audio voice shall give floor designations. The voice announcer shall be a digitized floor announcer that will announce the floor numbers and direction of travel and special announcements. The voice announcer shall be a natural human voice that recites messages and shall comply with ADA requirements for audible car position indicators. The voice announcer shall be a full range loudspeaker to be located on top of the cab. The voice box shall be concealed above the elevator dome. The speaker shall be mounted center of the elevator dome or as directed by the COTR. The voice announcer unit shall contain 21 ports which can accommodate 21 standard floors and direction messages. Install voice announcer per manufacturer's recommendations and instructions. The voice announcer shall be the product of one manufacturer of established reputation. Provide manufacturer literature and list of voice messages. Provide special messages as directed by COTR.

1. Fire service message.

2. Please do not block the doors.

3. Medical emergency message

2.41 CAR POSITION INDICATOR: NEW

A. Provide an L.E.D. digital type of car position indicator. Locate in new main car operating panel. Remove existing car position indicator. Provide matching stainless steel to cover existing position indicator box area. L.E.D. digital readouts for floor numbers and direction arrows shall be a minimum of 2 inches high.

2.42 HALL POSITION INDICATOR

A. Remove all existing hall position indicators and hall lanterns at all floors. Provide new L.E.D. digital type hall position indicators. L.E.D. digital readouts shall be a minimum of 2 inches high for direction arrows and floor numbers. Provide separate arrival arrows for up and down direction. Provide white for up and red for down. Provide new wiring. Install cover plate to cover all existing hole.

B. Corridor position indicator shall be equipped with a clearly audible electronic chime which shall sound once for “UPWARD” bound car and twice for “DOWNWARD” bound car. Audible signal shall not sound when a car passes the floor without stopping.

2.43 COMPUTER VIDEO TERMINAL: C.V.T. for elevator diagnostic system.

A. A diagnostic System Indicator Panel (computer screen) shall be installed in the machine room located in a controller or on a separate shelf centrally located. Provide one programmable keyboard.

1. The contractor shall provide for “trouble shooting” shutdowns and elevator problems displayed on C. V. T. screen. This shall consist of total diagnostics of operation.

B. The computer shall also contain illuminated indicators to provide the following information.

1. The floor where each elevator is located.

2. The direction in which elevator is currently traveling or is scheduled to travel.

3. The location and direction of each currently registered hall call. These lamps shall extinguish as each call is answered.

4. Elevator(s) currently out of service.

5. Elevator(s) currently bypassing hall calls.

6. Elevator(s) currently engaged in passenger transfers.

7. Operations program under which elevators are currently operating.

2.44 HOISTWAY ACCESS SWITCHES

A. Install new hoistway access switch in existing access switch key box.

B. The hoistway key switch shall be arranged to initiate and maintain movement of the car. When the car is being moved at the top terminal landing, the zone of travel shall be limited to a distance of approximately 10 feet down travel and a return to the top terminal.

2.45 HOISTWAY ENTRANCES: RETAIN EXISTING

A. Clean and reuse existing entrance frames, sills, hanger supports, strut angles, fascia plates, toe guards, door panels, door tracks, door hangers, rollers, bumpers and non-vision wings.

B. Replace existing pick up and release rollers. Replace existing closers.

C. Existing entrance stainless steel frames shall be cleaned and polished.

D. Sand and repaint existing hoistway doors and painted part of hoistway frame entrances.

2.46 ELECTRIC POWER DOOR OPERATORS: INSTALL NEW

A. Closed Loop High Performance door operators shall be provided to automatically open the car and hoistway doors simultaneously when the car is level and automatically close the doors simultaneously at the expiration of the open timing. Motor shall be of the high-internal resistance type, capable of withstanding high currents resulting from stall without damage to the motor. The door operator shall be capable of opening a car door and hoistway door simultaneously at a maximum speed of not less than 2 feet per second. The closing speed shall be one foot per second. A reversal of direction of the doors from the closing to opening operation whether initiated by the infrared curtain unit, or the door open button, shall be accomplished within no more than 1-1/2 inches of door movement. Particular emphasis is to be placed on obtaining quiet interlock and door operation and smooth, fast, dynamic braking for door reversals and stopping of the doors at both extremes of travel. All levers operating the doors shall be constructed of heavy steel members and all pivot points shall have ball or roller bearings. Electric power shall be used to open and close the doors. Springs may be used for auxiliary automatic door closers required under Rule 2.11.3 of the Code.

B. Door operator shall open and close both car and hoistway door simultaneously. Inherent design and installation of door operating devices shall be such as to preclude possibility of any hoistway door panel being disengaged from operating devices under any condition of operation of cars. Doors shall open automatically when car has stopped at landing. Doors shall be synchronized with operation of leveling car and opening car and hoistway doors simultaneously. Car and hoistway doors shall close automatically after an adjustable predetermined time sufficient to allow passengers to enter and leave the car. Before the interlock circuit is established, hoistway door for landing shall lock and remain in closed position until the car makes another stop at that landing.

C. Door shall operate smoothly and without slam in opening and closing directions and shall be cushioned in final movement in each direction of travel by regulated and adjustable electric power or other equally effective means. No electrical power shall be required to hold doors either open or closed. Hoistway doors shall be provided with door closers arranged to close open doors automatically if car for any reason leaves landing zone. In case of interruption or failure of electric power, mechanism shall permit manual opening from within car at door zone only. Door operator shall operate in

conjunction with, incorporate in its design, or be equipped with interlocks or safety switches. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone. Elevator, when out of the leveling zone, is restricted to 4 inch opening. Provide door locking device as per code.

D. Provide new infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully open position should the unit be actuated while the doors are closing. Curtain unit shall function at all times when the doors are not closed, irrespective of all other operating features.

E. Should the doors be prevented from closing for more than a predetermined adjustable interval of 20 to 60 seconds by operation of the curtain unit or door open button, these devices shall be rendered unable to cause door reversals, the doors shall stay open, the audio voice message shall sound and a buzzer located on the car shall sound. Do not provide door nudging.

F. Provide car and hoistway door open and close buttons. When the door open button is pressed, the doors, if in the open position, shall remain open, or if the doors are closing, they shall stop, reverse and re-open. Momentary pressure of the door close button shall initiate the closing of the doors prior to the expiration of the normal door open time. The open and close buttons shall be located in the car operating station below the floor buttons. The door open button shall be located adjacent to the door opening.

G. Should the doors be prevented from closing by an obstruction that does not activate a door re-opening device, for more than an adjustable interval of 15 to 60 seconds the doors shall automatically reverse to the full open position.

H. Provide new door clutch, gate switch, door header, track, arms and related door equipment.

2.47 ELECTRIC INTERLOCKS: NEW

A. Equip each hoistway door interlock with new interlock contacts to prevent operation of car until all hoistway doors are locked in closed position as defines by code. Interlocks shall prevent opening of hoistway doors from corridor side, unless car is at rest at landing, is operating in leveling zone at landing or hoistway access is used

B. Hoistway interlocks shall not be accepted unless it has successfully met requirements of Rule 2.12 of Code. Retiring cams or other approved devices shall be securely fastened to the car and shall be arranged to operate the interlocks without objectionable noise, shock or jar.

C. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equal.

D. Equip car doors with electric contact which prevents operation of car until door is closed as defined in the Code, unless car is operating in leveling zone or hoistway access is used. Locate door contact to prevent its being tampered with from inside the car. Car door contact shall not be accepted unless it has successfully met requirements of Rule 2.12.6 of the Code.

E. Provide devices, either mechanical or electrical, which shall prevent operation of the elevator in the event of an accident to or defective door operator equipment has permitted an independent door panel to remain in the “UNCLOSED” or “UNLOCKED” position.

2.48 CAR SLING: REUSE EXISTING CAR SLINGS

A. Present car frame shall be checked for proper alignment and correct if necessary. All bolt connections shall be checked, tightened or replaced, where necessary.

2.49 CAR PLATFORM FOR PASSENGER ELEVATORS: REUSE EXISTING

A. Reuse existing platforms. Passenger elevators shall have new sheet vinyl flooring not less than 1/8 inch thick. Type and color shall be submitted for selection by COTR. Adhesive material shall be the type recommended by the manufacturer of the tile. Lay tile flush with cover base of car.

B. Provide toe guards to comply with rule 2.15.9 A17.1 code.

2.50 CAR ENCLOSURES FOR ELEVATORS: INSTALL NEW INTERIOR WALL COVERING

A. Reuse existing cabs. Refinish all reused stainless steel cab panels. Remove existing laminated panels. Re-skin side and rear walls with new stainless steel sheets from the floor to 48 inches above floor. Install new side and rear wall panels 48 inches from finished floor to ceiling. They shall be covered with new plastic laminate. Apply the plastic laminate to a minimum ½ inch fire rated particle board that meets ASME and Federal requirements. Submit a method of fastening particle board to steel. The particle board shall be one piece on back and side walls. COTR shall choose the color and type of stainless steel and laminate panels.

B. Bolt side exit doors shut. Remove safety switches and cover over doors with new cab interior panels.

C. Provide new top emergency exit electrical switch.

D. Install new handrails at 30” and 42” to ctr. above finished floor.

1. 75 mm (3 inches) wide by 9 mm (.35 inch) thick flat stock Stainless Steel.

2. Locate handrails approximately 38 mm(1.5 inches)from cab wall. Curve end of handrails to walls. Conceal all handrail fastenings. Handrails shall be removable from inside the car enclosure.

E. Repaint dome bright white.

F. Install new drop ceiling egg create type panels in existing frame, panel and color to be selected by COTR. Add “T” frame to the middle of each section of drop ceiling if needed to prevent panels from sagging.

G. Install new cab ceiling lights. Install 4 sets of T-8 fluorescent light tubs 4 feet long with new ballasts.

H. Provide new fan blower unit.

I. Provide a stainless steel capacity plate on front return panel.

J. Install new GFI electrical receptacle located in front return panel below main car operating panel.

K. Provide elevators with new stainless steel cab doors. Construct door panels to be flush hollow metal construction, not less than one inch thick, consisting of not less than one piece continuous 16 gauge stainless steel on car face side and leading and trailing edges. Separate by two plates of sound deadening material and reinforced by steel shapes welded to the plates at frequent intervals. Reinforce panels as required for installation of hangers, power operating and door operating devices. Hang door on two point suspension hangers having ball bearing sheaves not less than three inches in diameter with rubber or non-metallic sound reducing tires. Equip hanger with adjustable ball rearing rollers to take up thrust of panels. Up thrust roller shall be capable of being locked in position after adjustments to a maximum of 0.015 inch clearance. Provide two non-metallic door gibs on each door panel. Gibs shall be replaceable without removable of door panel.

L. Provide an emergency car lighting system on each car, consisting of a rechargeable battery, charger, controls, and light fixture. The system shall automatically provide emergency light in the car upon failure or abnormal interruption of the normal car lighting service, and function irrespective of

the position of the light control switch in the car. The system shall be capable of maintaining a minimum illumination of 1.0 foot-candle when measure 4 feet above the car floor, and approximately one foot in front of the car operating panel, for a period of not less than four hours. Emergency light shall be located in main car operating panel.

2.51 AUTO DIAL SYSTEM: NEW

A. Remove existing phone or intercom system located in the cab.

B. Auto dial system shall be provided for each elevator to replace existing phone system. Each auto dial shall have a separate number. Locate auto dial system in auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless steel cover plate. The words “Telephone, Push to Talk” shall be engraved in ¼ inch letters. When activated by the “PUSH TO TALK” button, the auto dial system shall automatically dial an emergency service number that is monitored 24 hours a day.

PART 3 - EXECUTION

3.1 SPACE CONDITIONS

A. The elevator machine room shall comply with Sections 3.7 and 2.7 of the ASME A17.1 Code 2005 edition.

B. Attention is called to existing overhead clearances, pit clearances, overall spaces available in hoistway and machine room and machine room environmental conditions in connection with completion of specified elevator work. Provide proper, satisfactory and code legal installation of equipment as a whole, including all construction, accessories, and devices in connection with elevator, mechanical and electrical work specified herein.

C. Any construction changes or relocation of equipment, conduit, wiring, etc., required to accomplish the specified elevator installation must be arranged and obtained by the contractor, subject to the approval of the Contracting officer. Cost of such changes shall be included in the base bid and shall form a part of the contract.

3.2 ARRANGEMENT OF EQUIPMENT

A. Clearance around new elevator, mechanical and electrical equipment shall comply with applicable provisions of NEC. Arrange new equipment so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same area.

3.3 WORKMANSHIP AND PROTECTION

A. All installations shall be made in a first class, neat and skillful manner by mechanics experienced in the trade involved. All details of the installation shall be mechanically and electrically correct. All materials and equipment shall be new and without imperfections.

B. Recesses, cutouts, slots, holes, patching, grouting, refinishing and the like to accommodate installation of equipment shall be included in the contractor's work. All new holes in concrete shall be core drilled.

C. No structural members shall be cut or altered. Work in place which is damaged or defaced shall be restored equal to original condition.

D. Finished work shall be straight, level and plumb, with true, sharp surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.

E. Sleeves for all conduit and other small holes shall project two inches above concrete slabs.

F. Where beams, slabs, or other building construction protrude more than two (2) inches into the hoistway, all top surfaces shall be leveled with 20 gauge steel at an angle of at least 75 degrees to the horizontal.

G. Contractor shall provide and maintain adequate fire extinguishers on site and in the areas where welding or cutting is to occur.

H. Provide screening between hoistways during construction.

3.4 PRETESTS AND TESTS

Pretest, as per specifications, the elevators and related equipment, in the presence of the COTR for proper operation before requesting final inspection.

A. Procedure outlined in the "Practice for Inspection of Elevators, Escalators and Moving Walks" (Inspectors Manual) ANSI A17.2 shall apply.

1. Final test shall be conducted in the presence of and witnessed by the Veterans Administration Consulting Support Office (00CFM3A), Elevator Engineers.

2. Government shall furnish electric power including necessary current for starting, testing and operating machinery of each elevator.

B. If required by the Veterans Administration elevator engineer, inspection shall be conducted at other than normal working hours.

1. Contractor shall furnish the following test instruments and materials on-site and at the designate time of inspection: properly marked testing weights, voltmeter, center-reading ammeter, thermometers, stopwatch, direct reading tachometer and a set of "walkie-talkies".

2. If during the inspection process, the Department of Veterans Affairs representatives determine the need the following instruments should be available within a four-hour period: megohm meter, vibration meter, sound meter and a light meter.

C. Inspection shall be made of workmanship and equipment furnished and installed for compliance with specification.

D. Balance Tests: The percent of counterbalance shall be checked by placing test weights in car until the car and counterweight are equal in weight when located at the mid-point of travel. If the actual percent of counterbalance does not conform to the specification, the amount of counterweight shall be adjusted until conformance is reached.

E. Full Load Run Test: Elevators shall be tested for a period of one hour continuous run with full contract load in the car. During the test ran, the car shall be stopped at all floors in both directions of travel for a standing period of not less than five nor more than 10 seconds per floor.

F. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with full contract load and no load in the elevator. Speed tests shall be made before the full load run test and after the full load run test. Speed shall be determined by applying a tachometer to the car hoisting ropes and/or governor rope. The actual measured speed of the elevator with all loads in either direction shall be within five percent of specified rated speed.

1. Full speed runs shall be quiet and free from vibration and sway. When cars are standing at the floor with doors open, they shall remain fully stopped with hoisting machine brake applied.

G. Temperature Rise Test: The temperature rise of the hoisting motor shall be determined during the full load test run. Temperatures shall be measured by the use of thermometers inserted into the various windings. Under these conditions, the temperature rise of the equipment shall not exceed 50 degrees Centigrade above ambient temperature. Test shall be started only when all

parts of equipment are within five degrees Centigrade of the ambient temperature at time of starting test. Other tests for heat runs on motors shall be as specified in the latest procedure of the Institute of Electrical and Electronic Engineers.

H. Check amp readings with empty, balanced, and full load. At full load, the amp readings shall not exceed the motor nameplate amperage.

I. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car, balanced load in car and with contract load in car, in both directions of travel. Accuracy of floor leveling shall be within plus or minus 1/8 inch of level with any landing floor for which the stop has been initiated (with a definite range of distance in advance of the landing) regardless of load in car or direction of travel. The car leveling device shall automatically correct over travel as well as under travel and shall maintain the car floor within plus or minus 1/8 inch or level with the landing floor regardless of change in load.

J. Brake Test: The action of the brake shall be prompt and a smooth stop shall result in down direction with no load up to and including 125 percent of contract load in the car. Up travel not required.

K. Insulation Resistance Test: The elevator's complete wiring system shall be free from short circuits and grounds and the insulation resistance of the system shall be determined by use of megohmmeter, at the discretion of the Veterans Administration representative conducting the test.

L. Safety Devices and Governor Tests: The safety devices and governor shall be tested as required by Rule 8.10.2 of the Code.

M. If equipment fails, test requirements and re-inspection is required. The Contractor shall be responsible for costs of re-inspection, including salaries, transportation expenses and other expenses of the representatives of the COTR.

N. Limit Stops:

1. The position of the car when stopped by each of the normal limit stops with contract load in the car shall be accurately measured. The car shall reach the terminal landings under the above condition.

2. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at contract speed for both tests. Normal limit stopping devices shall be inoperative for the tests.

O. Setting of Car Door Contacts: The position of the car door at which the elevator may be started shall be measured. The distance from full closure shall not exceed that required by the Code. The test shall be made with the hoistway doors closed or the hoistway door contact inoperative.

P. Setting of Interlocks: The position of the hoistway door at which the elevator may be started shall be measured and shall not exceed the Code Requirements.

Q. Operating and Signal System: The elevator shall be operated by the operating devices provided and the operation signals and automatic floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration or deceleration. Stopping shall be without bumps or jars.

R. Performance of the elevator dispatching system shall be witnessed and approved by the COTR’s representative.

3.5 PAINTING AND FINISHING

A. Controllers and all other uncoated ferrous metal items shall be painted not less than one factory priming coat or approved equal.

B. Upon completion of installation and prior to final inspection, all equipment shall be thoroughly cleaned of grease, oil, cement, plaster and other debris. All equipment, except that otherwise specified as to architectural finish, shall then be given two coats of paint of approved color, conforming to manufacturer's standard.

C. No field painting of governors shall be permitted.

D. Paint floor designation not less than four inches high on hoistway doors, fascias and/or walls as required by Rule 2.29.2 of the Code. The color of paint used shall contrast with the color of the surfaces to which it is applied.

E. Elevator hoistway machines, controllers and selectors shall be identified by 4-inch high numbers located as directed. Governors, shunt trip circuit breakers, safety plank and cross heads of cars shall be identified by 4-inch high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be stenciled

F. Surface of door frames, door panels, interior cab surfaces, etc., that become damaged or marred during renovations shall be restored to original condition in a satisfactory manner before final acceptance of work.

3.6 INSTRUCTION OF PERSONNEL

A. Provide competent instructors to train VA personnel in operation of the equipment and accessories installed under this contract for eight hours. Instruction shall commence after completion of all work and at such time as directed by the COTR. Training shall be conducted during the hours of 8:00 AM through 4:30 PM.

B. In addition to oral instruction, written instructions in triplicate relative to car, adjustment and operation of all equipment and accessories shall be furnished and delivered to the COTR in independently bound folders. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electric apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts lists with descriptive literature and identification and diagrammatic cuts of equipment and parts.

C. Provide any supplementary instruction for adjustment and care of new equipment that may become necessary because of changes, modification and/or replacement of equipment or operation under requirements of paragraph entitled "GUARANTEE".

3.7 INSPECTIONS AND MAINTENANCE SERVICE

A. Furnish complete maintenance and inspection service on entire elevator systems. The modernized elevator systems shall be guaranteed for a period of one (1) year, beginning with the completion and acceptance by the COTR of the last elevator. Maintenance work shall be performed by skilled elevator personnel directly employed and supervised by the same company that furnished and installed the elevator equipment specified herein.

B. This contract will cover full maintenance, which includes emergency call back service, inspections and preventive maintenance of each of the elevators listed in the Schedule of Elevator. The Contractor shall be required to perform WEEKLY inspections during the one year maintenance period. During the inspection visit, the Contractor shall clean, adjust and lubricate the equipment. Determine the nature and extent of any trouble required to restore

the elevators to satisfactory service, and if conditions warrant, furnish and install parts.

C. When and as required, motors, controllers, relay panels, selectors, leveling devices, operating devices, switches, in car and in hoistways, hoistway door and car door or gate operating device, interlock-contacts, guide shoes, guide rails, car door sills, hangers for doors, car doors or gates, signal system, car safety device, governors, tension and sheaves in pit shall be cleaned, lubricated and adjusted. Hoist motor brushes shall be checked for wear at least every two weeks. Accumulated carbon shall be removed from the commutators, brush rigs and windings at the same time.

D. Furnish all lubricant, cleaning materials and parts required.

E. Cleaning Services: Guide rails, overhead sheaves and beams, counterweight frames, bottom of platforms and machine rooms floors shall be brushed cleaned at least once every four month. Car tops shall be cleaned monthly. All accumulated rubbish shall be removed from the pits monthly. A general cleaning of the entire installation including all machine room equipment and hoistway equipment shall be accomplished quarterly. Necessary cleaning supplies, vacuum cleaner, shall be furnished by the Contractor.

F. Adjustment services: All hoistway ropes shall be examined and the tension shall be adjusted whenever necessary to insure maintenance of adequate safety factors.

G. Materials to be furnished: The Contractor shall furnish all lubricants, cleaning supplies and tools necessary to perform the work described above. All lubricants shall be as recommended by the manufacturer of the equipment.

H. This guarantee service shall not include the performance of any work required as a result of improper use, accidents, or negligence for which the contractor is not directly responsible.

I. Provide 24 hour emergency call-back service which shall consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency trouble develop between regular examinations. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of the equipment and persons in and about the elevator.

J. Service and emergency personnel shall report to the COTR or his authorized representative upon arrival at the medical center and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed shall be given to the COTR.

K. The contractor shall maintain a log in the Elevator Machine Room. The log shall list the date and time of all weekly examinations and all trouble calls. Each trouble call shall be fully described including the nature of the call, necessary correction performed or parts replaced.

L. When arriving on site to start elevator renovation, the Elevator contractor shall start to maintain elevators P1 and P2 during renovation period. This will be a non billable cost to the VAMC. This maintenance period shall be included in the renovation bid. This is separate from the one year maintenance contract which starts with the completion of project.

END SECTION 14225

VAMC KERRVILLE, TX

BUILDING #11 ELEVATOR #E4

PROJECT #671A4-07-111ES

SECTION 14225 A

MODERNIZATION OF EXISTING TRACTION ELEVATOR

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section of the specification is intended to cover the complete furnishing of all labor, materials, supervision, engineering, and components on elevator located in Building #11. The elevator included in the specification is the existing elevator E4.

1.2 SCOPE OF WORK

A. Remove existing and install new: controller, hoistway and car doors, door operator, cartop controls, car stations, cab walls, ceiling, floor, hall fixtures and roller guides.

B. Elevator shall retain existing machine beams, main and counterweight rails, buffers, counterweight, entrance frames, sills, hanger supports, strut angles, fascia plates, sling, platform and cab.

1.3 ELEVATOR SERVICE

A. Prior to final acceptance the contractor shall complete all pertinent safety tests and inspections. Final inspection and tests shall be given only when all work on the elevator has been completed. Final contract acceptance shall be given only upon successful completion of final inspection and tests.

B. The premises shall be occupied during performance of work. The elevator contractor shall have uninterrupted use of scheduled elevator vacated for completion of work.

1.4 WORK SCHEDULE

A. Before work is started, submit prepared work schedule for approval and arrange with COTR sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways and elevators, location of temporary partitions, etc. The COTR must be notified twenty (20) calendar days, in writing, in advance of starting work on elevators. No work may begin on any elevator until all materials for that elevator have been delivered to the site and verified by the Contracting Officer and/or Contracting Officer’s Technical Representative. The phasing of work on the elevators shall be coordinated with the Contracting Officer and/or the Contracting Officer’s Technical Representative.

1.5 SAFETY PRECAUTIONS

A. Building will be occupied during execution of work. Work shall be conducted in a manner to afford maximum protection of building, facilities, patients, employees and the public and to prevent unreasonable delay or interference with normal functioning of hospital activities.

B. Where adjacent car is in operation, isolate elevators from each other by suitable barriers between them, extending from pit floor to bottom of secondary slab at top of hoistway, while work is in progress. Remove partition when work is completed.

C. Provide fire extinguishers that are readily available at all times.

D. It shall be the obligation of the Contractor to maintain a free and clear passageway in each elevator lobby. Parts, tools, etc. shall be kept within the confines of entrance partitions. Trash and debris shall be removed daily.

1.6 REMOVED MATERIALS AND EQUIPMENT

A. Materials that are required to be removed and not specified to be reused or retained under contract shall be removed daily from the site at the expense of the Contractor. Contractor shall receive title to all materials and equipment required to be removed and not specified to be reused or retained, as of date of withdrawal of material from service by Contractor to complete required and scheduled work. Government does not warrant condition of said material to which Contractor shall obtain title, nor shall Government be liable for damage before or after title passes to Contractor.

1.7 APPLICABLE PUBLICATIONS

A. The following specifications and standards of the issues listed below (including the amendments, addenda, and errata designated) form a part of this specification to the extent indicated by the reference thereto. In text, such specifications and standards are referred to by basic number or designation only.

B. Federal Specifications (Fed. Spec.)

J-C-30B(l)....Cable and Wire: Electrical (Power, Fixed Installation)

W-C-596A(2)....Connector, Plug, Electrical; Connector, Receptacle, Electrical

W-F-406E....Fittings for Cable, Power, Electrical & Conduit Metal, Flexible

W-F-408E....Fittings for Conduit, Metal, Rigid, (Thick-Wall & Thin Wall (EMT) Type).

ABSI/UL 797....Conduit, Metal, Rigid: Electrical, Thin-wall Steel Type (Electrical Metallic Tubing): Straight Lengths, Elbows & Bends

WW-C-566C.....Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Zinc-coated

1. GAUGES: Sheet and Plate: U.S. Standard Wire: American wire Gauge (AWG)
2. Dl.1-72: American Welding Society (AWS)
3. IEEE: Institute of Electrical and Electronic Engineers
4. NEMA: National Electric Manufacturers Association
5. NFPA No. 252: Fire Tests of Door Assemblies

C. The following standards and codes of the issues listed below (including the latest amendments, addenda, and errata) form a part of this specification:

1. A17.1: 2007 American National Standards Institute (ANSI/ASME) Standards: Safety Code for Elevators and Escalators. In text, publication will be referred to as the Code.

2. A17.2: 2004 American National Standards Institute (ANSI) Standards: Practice for the Inspection of Elevators, Escalators and Moving Walks, Inspector's Manual.

3. NFPA No. 70: (Latest version) National Electrical Code. In text, the Code will be referred to as NEC.

4. Uniform Federal Accessibility Standards & VA Supplement to uniform Federal Accessibility Standards, 1988.

5. Americans with Disabilities Act, Latest edition with supplements.

6. NFPA 2009 Life Safety Code.

1.8 QUALIFICATIONS

A. Approval by the Contracting Officer is required of products or services of proposed manufacturer, suppliers and installers and will be contingent upon submission by Contractor of a certificate stating the following:

1. Elevator contractor is currently and regularly engaged in modernization of elevator equipment as one of his principal products.

2. Installer has technical qualifications of at least five years of successful experience, trained supervisory and installation personnel, and facilities to install and/or modernize elevator equipment specified herein.

3. Proposed Contractor shall submit a list of two or more prior hospital installations where all the elevator equipment he proposes to furnish on this project has performed satisfactorily together under conditions of normal use. The list shall include projects that have been in operation for a period of not less than two years proceeding the date of these specifications; include the names and addresses of the Medical Center and the names of the Medical Center Administrators.

B. Approval of elevator contractor’s equipment will be contingent upon his being able to provide a permanent and satisfactory maintenance service branch which shall render services within two hours of receipt of notification. Elevator contractor shall submit the names and addresses of his authorized branch or service department which will render service to this installation, together with certification that the quantity and quality of replacement parts stock on hand is sufficient to guarantee continued operation of the elevator installation.

C. Elevator equipment shall operate with maximum noise level no more than 80 decibels. They shall be sufficiently quiet so that they will not create objectionable noises in the car and hoistway, or create a disturbance to occupants on the various floors adjacent to the hoistway and machine room. The COTR reserves the right to reject equipment and installations which are, in their opinion, not sufficiently quiet under all operating conditions.

1.9 WIRING DIAGRAMS

A. Provide three complete sets of field wiring and straight line wiring diagrams showing all electrical circuits in the hoistway, as well as the machine room. Install one set framed under glass or on pivoted hard boards coated with an approved plastic sealer and mounted in the elevator machine room as directed by the COTR. In the event field modifications are found necessary during installation, diagrams shall be revised to include all corrections made prior to and-during the final inspection. Corrected diagrams shall be delivered to the Engineering Officer within 30 days of final acceptance.

B. The following information relating to the specific type of microprocessor controls installed on this project shall be provided:

1. Owner’s information manual, containing general data on major components maintenance and adjustment.

2. System logic description.

3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and/or replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.

4. Changes made during the warranty period shall be noted on the drawing in adequate time to have the finalized drawings reproduced for mounting in the

machine room no later than six months prior to the expiration of the warranty period.

1.10 ADDITIONAL EQUIPMENT

A. Additional equipment required to operate specified equipment manufactured and contemplated for this installation shall be furnished and installed. The cost of such equipment shall be included in the base bid.

1.11 SAMPLES AND DESCRIPTIVE DATA

A. Materials shall be submitted singularly and separately and apart from materials specified under other Sections and shall be marked “SUBMITTED UNDER SECTION 14226,” in accordance with provisions of SECTION 01340, SAMPLES AND SHOP DRAWINGS. All submitted drawings and related elevator material shall be forwarded to South Texas Veterans Health Care System, Facilities Management room #138, 7400 Merton Minter Blvd., San Antonio, TX 78229, to the attention of Jeff Moore in order to perform a concurrent review.

B. Before executing any work, furnish information sufficient to evidence full compliance with contract requirements on proposed items. Such information shall include, as required: Manufacturer’s Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity, and rating) and corresponding specification references (Federal or project specification number and paragraph).

C. Name of manufacturer, type or style designation and applicable data of the following equipment shall be shown on the elevator layouts:

1. Controller
2. Selector/Leveling unit
3. Solid state motor control (AC DRIVE)
4. Electric door operator; HP rating and RPM of motor
5. Auto dial phone system
6. Hoist rope gripper
7. Top of car run button.

D. Shop Drawings:

1. Cuts or drawings and description of power door operator.
2. Cuts or drawings showing details of all signal and car equipment fixtures.
3. Furnish certificates as required under paragraph “Qualifications”.
4. Car operating panels.
5. New AC hoist motors and machines.

1.12 PERFORMANCE STANDARDS

A. The elevators shall be capable of meeting the highest standards of the industry and specifically the following.

B. Contract speed shall mean speed in the UP direction with full capacity load in the car. Speed variation under any load condition, regardless of direction, shall be no more than 5 percent.

C. The controlled rate of change of acceleration and retardation of the car shall not exceed O.lG per second and the maximum acceleration and retardation shall not exceed 0.2G per second.

D. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration. Stopping shall be without bumps or jars.

E. Full speed running shall be quiet and free from vibration and swaying. When cars are standing at the floor with doors open, they shall remain firmly stopped and shall not rock side to side.

F. Rope stretch recovery shall be provided to re-level cars at a floor, if the ropes slightly stretch.

G. Cars shall not move from side to side during the process of opening and closing the doors.

H. Elevator control systems shall be capable of starting the car without noticeable "roll-back" of hoistway machine sheave, regardless of load condition in car, location of car, or direction of travel.

1.13 TOLERANCES

A. Floor Accuracy:

1. Leveling control systems, 1/8 inch above or below the floor.

1.14 GUARANTEE

A. The modernized elevator systems shall be guaranteed beginning with the completion and acceptance of the last elevator installation by the COTR. It shall be subject to terms of "GUARANTEE" articles of Section GENERAL CONDITIONS (except for length of guarantee). Upon receipt of notice from the Government of failure of any portion of materials and workmanship furnished, affected part or parts shall be replaced promptly with new parts by and at the expense of the contractor. The guarantee period shall concur with the length of the maintenance contract.

B. No device will be acceptable that will not give perfect satisfaction without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with specification requirements, or if in the opinion of the COTR, excessive maintenance and attention must be employed to keep device operating, device shall be installed as part of work until satisfactory operation of installation is obtained. Period of guarantee shall start anew from date of completion of new installation performed in accordance with foregoing requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Where stainless steel is specified, it shall be corrosion resisting steel complying with Fed. Spec. QQ-S-766, Class 302 or 304, Condition A with Number 4 finish (150 grit) on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and all surfaces shall be perfectly smooth and without waves. During erection, all stainless steel surfaces shall be protected by suitable material.

2.2 MANUFACTURED PRODUCTS

A. Materials, devices and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. Items not meeting this requirement, but which otherwise meet technical specifications and the merits of which can be established through reliable test reports or physical examination of representative samples, will be considered.

B. When two or more units of same class of materials, devices or equipment are required, these units shall be products of one manufacturer.

C. Manufactures of equipment assembles which include components made by others shall assume complete responsibility for the final assembled unit.

1. All components of an assembled unit shall be products of the same manufacturer.

2. Parts that are alike shall be the product of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for the intended service.

D. If the elevator equipment to be installed is not known to the COTR, the Elevator Contractor shall submit drawings in triplicate (2 prints and 1 sepia), for approval, showing all details or demonstrate to the satisfaction of the COTR that the equipment to be installed is in strict accordance to the Specifications.

E. Welding at the project site shall be made by welders and welding operators who have previously qualified by test as prescribed in American Welding Society Publications AWS Dl.1 to perform type of work required. VAMC shall require welding certificates be submitted for all workers employed in this capacity. A burning permit is required before any burning or welding is done.

F. Motor nameplates shall state rated horsepower, speed, volts, amperes and other characteristics required by NEMA Standards and shall be securely attached to the item of equipment in a conspicuous location.

G. The elevator equipment, including controller, selector, door operator, relay panel, leveling unit, and supervisory system, shall be the product of one manufacturer of established reputation, except that any of the above items may be the products, either wholly or in part, of any manufacturer of established reputation provided such items are capably engineered and produced under coordinated specifications to ensure a first class, safe and smooth operating system.

H. Where key operated switches are furnished in conjunction with any component of this elevator installation, furnish four keys for each individual switch or lock. “Barrel” type keys shall not be used. Attach each key to a tag bearing a stamped or etched legend identifying its purpose. Engrave tags and imprint “Property of U.S. Government” on reverse side.

2.3 CAPACITY, SPEED, TRAVEL, ETC.

A. Each elevator shall have the capacity to lift a live load (exclusive of the weight of the car and ropes) at the speed in feet per minute as specified in the following schedule:

Elevator Number	Rated Load Lbs.	Rated Speed FPM	Floors Served	# of Stops	# of Opening	Total Travel Ft.
E4	4000	150	G-1-2	3	3	35’ 6”

B. Total travel is approximate and must be verified in the field by the Contractor.

C. Rated speed shall mean speed in either direction of travel with rated capacity load in car. Actual speed, under any load condition shall not vary more than five percent of rated speed.

2.4 POWER SUPPLY

A. Power for emergency operation of elevators specified will be available from emergency power feeders and transfer switch.

B. Install New Shunt Trip Breaker located in elevator machine room.

2.5 AUXILIARY POWER OPERATION: REUSE EXISTING

A. The control system for elevators shall include provisions for normal power operation on auxiliary power upon failure of the supply.

B. Auxiliary power supply, including its starting means and a transfer switch for transfer of power supply from normal to auxiliary shall be reused.

C. Upon loss of normal power supply and returning to normal power, there shall be a delay before transferring to auxiliary power. The delay shall be accomplished through an adjustable timing device capable of delays from zero seconds to sixty seconds.

2.6 GROUNDING

A. Equipment grounding shall be provided. Ground conductors, supports, controller enclosure, motors, platform and car frames and other noncurrent conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, insulated and sized as required by NEC. Bond the grounding wires to each pull boxes, junction boxes, cabinets and other enclosures through which the wires pass.

2.7 CONDUIT, WIREWAY (DUCT)

A. Existing conduit that conforms to NEC may be reused. New conduit shall comply with the following paragraphs.

B. Unless otherwise specified or approved, install electrical conductors, except traveling cable connections to the car, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Where permitted by NEC, 1/2-inch trade size conduits and EMT may be used only for tap connections to interlocks, emergency exits and leveling units. All raceways completely embedded in concrete slabs, walls, or floor fill shall be rigid steel conduit. No rigid conduit or electrical metallic tubing shall be smaller than 3/4-inch electrical trade size. An auxiliary gutter may be used between controller, starter, and similar apparatus in the elevator machine room. Fully protect self-supporting connections, where approved, from abrasion or other mechanical injury. Flexible metal conduit not less than 3/8 inch electrical trade size may be used, not exceeding 18 inches in length, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC. Flexible heavy-duty service cord, type S.O., may be used between fixed car wiring and switches on car doors for infrared curtain units.

C. All conduit terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have approved insulation bushing. Install a steel lock nut under the bushing if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.

D. Conduit and EMT fittings and connectors using set screws or indentations as a means of attachment shall not be used.

E. Connect motors or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits. Certain existing conduits and ducts may be reused if they are code conforming and prior agreement is received from the COTR.

2.8 CONDUCTORS: EXISTING TO BE REMOVED

A. Unless otherwise specified, conductors, exclusive of traveling cables, shall be stranded or solid coated annealed copper in accordance with Federal

Spec. J-C-30 for either type RHW or THW. Where 16 and 18 AWG are permitted by NEC, either single conductor cable in accordance with Federal Spec. J-C-580 for type TF or multi-conductor cable may be used, provided the insulation of single conductor cable may be, and outer jacket of multi-conductor cable is, flame retardant and moisture resistant. Multi-conductor cable shall have color coding or other suitable identification for each conductor. Conductors for control board wiring, including wiring between main circuit resistors and control boards, shall be in accordance with NEC. No joints or splices will be permitted in wiring, except as outlets. Tap connectors may be used in wireways provided they meet all UL requirements.

B. All wiring must test free from short circuits or grounds. Insulation resistance between individual external conductors and between conductors and ground shall be not less than one megohm.

C. Where size of conductors is not given, capacity shall be such that maximum current shall not exceed limits prescribed by NEC.

D. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors. The contractor may at his option make these terminal connections on No. 10 or small conductors with approved terminal eyelets set on the conductor with a special setting tool or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

2.9 TRAVELING CABLES: EXISTING TO BE REMOVED

A. All conductors to the car shall consist of flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on top of the car directly to controller. Junction boxes on car shall be equipped with terminal blocks. Terminal blocks having pressure wire connectors of the clamp type that meet UL 486A requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks shall have permanent indelible identifying number for each connection. Cable shall be securely anchored to avoid strain on individual terminal connections. Outer covering must remain intact between junction boxes. Abrupt bending, twisting and/or distortion of the cables shall not be permitted.

B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than four spare conductors in each traveling cable.

C. Provide shielded coaxial conductors for the auto dial system within the traveling cable or provide a separate cable for the auto dial system.

D. If, due to sway or change in relative position of traveling cables, complete freedom from contact with the hoistway or elevator construction cannot be obtained, shields, pads, or hardware cloth shall be provided on the elevator of hoistway structure wherever necessary to prevent damage to the traveling cables.

E. Car lighting circuits shall be connected to the auxiliary/emergency power panel.

F. Run traveling cable from car to machine room. Do not use half way box.

2.10 CONTROLLERS, STARTERS, RELAY PANELS, SUPERVISORY PANELS and SELECTORS

A. All controllers required for the control, dispatching, signals and door operations of the system shall be in accordance with the requirements of this section.

B. All controller assemblies shall provide efficient, smooth and practically step less acceleration and deceleration of the elevator hoisting machine, automatically and independently of the load in the car. The panel material

shall be self-extinguishing, having a flame resistance that meet the requirements of either flammability test method 2021 or 2023, or Federal Test Method Standard No. 406.

C. All switches, relays and other components shall be mounted on the front of controller, starter, relay and selector panels. All wiring connections for controller components, resistors in excess of 30-watt capacity and transformers shall be mounted within enclosure. All controller wiring shall be neatly formed, laced and securely fastened in place.

D. If swing panel construction is used for any controller components, details shall be submitted for approval.

E. Wiring of the various external control and operating circuits shall be brought to a terminal board in the controller from where it shall continue to the various switches, solenoids and other devices on the panel. Connections of wires to terminals from external circuits shall be made with metal eyelets, solder-less lugs or similar connectors. Starting and accelerating resistance shall be constructed of resistance wire or cast iron grids insulated with mica or other approved material and mounted to give constant pressure at all temperatures. If wire resistance is used, the material shall be capable of withstanding frequent heating and cooling cycles without excessive oxidation or crystallization and shall not be affected by atmospheric conditions. Resistance in connections with solenoids, etc., shall be wire, wound on noncombustible forms of insulating material and mounted so as to be readily renewable.

F. Equipment shall be provided to protect the driving motor against overload and single phasing in all three (3) phases of the delta connection, protect the control equipment against overload and phase reversal.

G. Where time delay relays are used in the circuits, they shall be of an acceptable design that is reliable and consistent, such as condenser timing or electronic timing circuits. No dash pot time relays shall be used.

H. Each device on all panels shall be properly identified by name, letter or standard symbol which shall be neatly stencil painted (or otherwise marked), in an indelible and legible manner, on device or panel. Identification markings shall be coordinated with identical markings used on wiring diagrams. The ampere rating shall be marked adjacent to all fuse holders. All spare conductors to controllers, selectors and relay panels shall be neatly formed, laced and identified.

I. Safety switch shall cut off current, automatically apply the brake and stop car upon current failure and/or upon operation of any electrical safety device.

2.11 MICROPROCESSOR CONTROL SYSTEM

A. Provide solid state components and printed circuit boards to control the hoisting machine and signal functions in accordance with these specifications. Complete details of the components and printed circuit boards, together with a complete operational description, shall be submitted for approval. All controllers shall be non-proprietary and no special tool, including a hand held testing tool shall be necessary for adjustments or maintenance. The controller vendor shall be able to provide immediate tech support and be able to overnight mail any parts necessary for maintenance.

B. All controller assemblies shall provide efficient, smooth, stepless acceleration and deceleration of the elevator hoisting machine, automatically and irrespective of the load in the car. All control equipment shall be enclosed in a metal cabinet with lockable, hinged door(s) and shall be provided with a means of ventilation. All non-conducting metal parts in the machine room shall be grounded in accordance with NEC. Cabinet shall be securely attached to the building structure.

C. Modules for the control of each elevator system, including dispatching, signals, door operation and special operation, shall be installed in a NEMA, Type 1, General Purpose Enclosure. Circuit boards shall be moisture-resistant, be non-corrosive, be nonconductive, be fabricated of noncombustible material and be of adequate thickness to support the components mounted thereon.

D. Each device, module and fuse (with ampere rating) shall be identified by name, letter or standard symbol in an approved indelible and legible manner on the device or panel. Coordinate identification markings with identical markings on wiring diagrams.

E. The electrical connections between the printed circuit boards (modules) and the circuit connectors incorporated in the mounting racks shall be made through individual tabs which shall be an integral part of each module. The tabs shall be nickel-gold plated (or of other approved metal or equal electrical characteristics). Modules shall be keyed or notched so as to prevent insertion of the modules in the inverted position.

F. Light emitting diodes (LEDS) shall be for visual monitoring of individual modules.

G. Components shall have interlocking circuits to assure fail-safe operation and to prevent unwarranted elevator movement should any component fail to function properly.

H. Method of wire wrapping for point to point with connections on the mounting racks shall be submitted for approval.

I. Modules shall be of the type that plug into pre-wired mounting racks. Field wiring or alternation shall not be necessary in order to replace defective modules.

J. Field wiring changes required during construction shall be made only to the mounting rack connection points and not to the individual module circuitry or components. If it becomes necessary to alter individual modules, they shall be returned to the factory where such design changes shall be made and module design records changes so that correct replacement units shall be available.

K. Module boards shall be fabricated from nonconductive, non-corrosive material and shall be of sufficient strength so as to support all components mounted thereon without warping. Mounting racks shall be spaced sufficiently apart to prevent accidental contact between individual modules.

L. All logic symbols and circuitry designations shall be in accordance with ASME Standards.

M. Solid state components shall be designed to operate within a temperature range of 30 degrees F to 104 degrees F. No temperature controller or air-conditioned rooms shall be required for proper operation of solid state components.

N. Wiring connections for operating circuits and for external control circuits shall be brought to terminal blocks mounted in an accessible location within the controller cabinet. Terminal blocks using pierce through serrated washers shall not be acceptable.

2.12 VARIABLE VOLTAGE VARIABLE FREQUENCY: (VVVF)

A. Solid State Motor Control:

1. Elevator control shall be affected by means of a compact solid state motor control unit for each elevator with electrical characteristics to suit the power supply. The system shall consist of the necessary three phase, full-wave bridge rectifiers and be fully regenerative.

2. Solid state motor control unit shall operate with high efficiency and low power consumption, have sufficient capacity to handle peak currents typical of elevator service and contain a balanced, coordinated fault protection system which shall accomplish not less than the following:

a. Protect the complete power circuit and specifically the power semi-conductors from failure under short circuit (bolted fault) conditions.

b. Protect against limited faults arising from partial grounds, partial shorts in the motor armature or in the power unit itself.

c. Protect the drive motor against sustained overloads. A solid state overload circuit shall be used.

d. Protect motor and power unit against instantaneous peak overload.

e. Provide semi-conductor transient protection.

f. Provide phase sequence protection to insure incoming line is phased properly.

g. Removable printed circuit cards shall be provided for the SCR control, designed so the tabs cannot be reversed.

2.13 GEARED TRACTION AC HOIST MACHINES; REUSE

A. Geared traction machines to meet ASME A17.1 Elevator Code.

B. The geared traction machine shall be of the single worm and gear, single wrap traction type, with motor, brake, worm gear housing and sheave pedestals mounted on a rigid bedplate.

C. Hoisting motor of geared traction machine shall be reversible AC current type and shall be designed to develop the required high starting torque with a low starting current and shall conform to the NEMA Standards for 50 degree C, sixty minute rated elevator hoisting motor.

D. Provide new brake linings.

E. Vibration isolating machine foundation and pads shall be furnished for machines mounted over hoistway.

2.14 SHEAVES

A. Retain deflector sheave.

B. Clean and check for wear.

C. Reuse guards on sheaves.

2.15 CAR AND COUNTERWEIGHT GUIDE RAILS

A. Retain existing car and counterweight guide rails and brackets.

B. Thoroughly clean all guide rails of grease, oil, rust and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car and counterweight.

C. Provide any required rail backing and/or intermediate tie brackets to comply with ASME Code for bracket spacing for both car and counterweight rails.

2.16 CAR AND COUNTERWEIGHT BUFFERS: REUSE EXISTING

A. Reuse existing buffers. Clean and paint.

2.17 COUNTERWEIGHTS: EXISTING TO BE RETAINED.

A. The counterweight shall be cleaned and all missing or damaged bolts, tie rods, frames and members shall be replaced.

B. Sub-weights shall be added to or removed from the counterweights frame to provide a counterbalance equal to the weight of the complete car and approximately 40 percent of the rated capacity. New sub-weights shall be sectional cast iron; flame cut hot rolled steel or cast lead. Test for this balance shall be witnessed in the presence of and as directed by the COTR.

C. Reuse existing counterweight guard.

2.18 HOISTING ROPES: REUSE

A. Reuse Hoisting Ropes on the elevator.

1. Ropes shall meet ASME A17.1 Code.

2.19 SAFETY DEVICES: REUSE

A. Reuse “Type B Safeties” on the car.

B. Field test of car safety and governor shall be as specified in the Section entitled "TESTS" of these specifications.

2.20 OVERSPEEED GOVERNOR: REUSE

A. Reuse governor with overspeed switch.

B. The governor rope clamping device shall be adjusted so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the safety. The grip jaws shall be of such shape and length that pull-through action of the governor rope, as required by Code, will result in a minimum amount of rope abrasion.

C. No field painting of governor parts shall be permitted.

D. Switch shall shut down elevator in both directions.

E. Reuse governor tail sheave.

2.21 GOVERNOR ROPE: REUSE

A. Reuse Governor Rope.

B. Under normal operation, rope shall run free and clear of governor jaws, rope guards and other stationary parts.

C. Governor Rope tag shall be securely attached to governor rope releasing carrier. Data tag shall be corrosion-resistant metal and shall bear data as required by the Code.

2.22 ASCENDING CAR OVERSPEED DEVICE: INSTALL NEW

A. Provide a device to prevent ascending over speed and unintended motion away from the landing when the doors are not locked in accordance A17.1 Section 2.19 of the 2005 edition.

2.23 NORMAL AND FINAL TERMINAL STOPPING DEVICES: REUSE

A. Normal and final terminal stopping devices shall conform to the Code.

B. Mount normal stopping switch on car or in hoistway to slow speed of car and bring it to an automatic stop level with the terminal landings.

1. Switch shall function with any load up to and including 125 percent of rated elevator capacity at any speed obtained in normal operation.

2. Switch, when opened, shall permit operation of car in reverse direction.

3. No normal stopping device, other than one mounted on car and activated by cams in hoistway, or mounted in hoistway and activated by cams on car, shall be permitted.

C. Mount final terminal stopping switches in the hoistway.

1. Switches shall be positively opened by car should the car travel beyond the normal stopping switches.

2. Switches, when opened, shall remove power from hoist motor, apply hoist machine brake and prevent operation of car in either direction.

2.24 WORKMAN'S LIGHTS AND OUTLETS: NEW

A. Provide lamps with wire guards on top of each elevator car and beneath the platform.

2.25 TOP-OF-THE CAR OPERATING DEVICE: NEW

A. The device shall conform to ASME A17.1.

B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked "“INSPECTION” and "NORMAL" on the faceplate, with 1/4-inch letters.

C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and a safety button.

D. Provide emergency stop toggle type switch as specified in ASME A17.1.

E. Provide permanent identification for the operation of all components in the device.

F. The device shall be permanently attached to the elevator crosshead on the side of the elevator which is nearest to the hoistway doors.

2.26 CAR LEVELING DEVICE: REMOVED EXISTING AND INSTALL NEW

A. Car shall be equipped with a two-way leveling device to automatically bring the car to within 1/8 inch of exact level with landing for which a stop is initiated regardless of load in car or direction of travel.

B. Car shall, at all times, level into the floor and shall not stop above or below the floor and level back.

C. The automatic leveling device shall, within its zone, be entirely independent of the operating device and if the car stops short or travels beyond the floor, the leveling device shall automatically correct this condition and maintain the car within plus or minus 1/8 inch of level with the floor landing regardless of the load carried and its stretching effect on the cables during loading and unloading.

D. A car leveling device functioning through the medium of vacuum tubes or photoelectric tubes or optic type is not acceptable. Approved permanent magnet, electromagnetic, encoder, or selector type leveling is required.

2.27 EMERGENCY STOP SWITCHES: NEW

A. Emergency stop switches shall conform to the Code.

B. Each stop switch shall be red in color and shall have its "identity" and STOP' and "RUN" positions legibly and indelibly identified.

C. Install new pit switches 4 ft. above lowest landing floor at top of pit ladder. Provide new stop switch in pit, 4 ft. above pit floor at the ladder.

2.28 OPERATING DEVICE FACEPLATES: NEW

A. Faceplates for the elevator operating and signal devices shall be inch line type stainless steel fixtures. Install all faceplates flush with surface upon which they are mounted.

B. New corridor pushbutton faceplates shall be the same size or larger as existing faceplates.

C. Fasten all car and corridor operating device and signal device faceplates with non-corrosive stainless steel spanner head or Bristol head tamperproof screws.

D. Design car and corridor push-button faceplates so that pressure on pushbuttons shall be independent of pressure on pushbutton contacts.

E. Engraved legends in faceplates shall have lettering 1/4-inch high filled with black paint.

F. Provide Braille on pushbutton faceplates.

G. Elevator Corridor Call Station Pictograph may be engraved in the faceplates.

2.29 OPERATING DEVICES AT HOISTWAY LANDINGS: EXISTING TO BE REMOVED

A. Provide new landing call buttons. Reuse existing push button boxes if 42 inch centerline above finished floor can be maintained for the new buttons. Cover or fill all unused holes.

B. The direction of each button shall be legibly and indelibly identified by arrows not less than ½ inch high in the face of each button.

C. Each button shall contain an integral registration light which shall illuminate upon registration of a call and shall extinguish when the call is answered. Install LED type light bulbs, white in color, in hall push buttons.

2.30 ELEVATOR CAR OPERATING PANELS: REMOVED EXISTING AND INSTALL NEW

A. New main car operating panels shall be located in the front wall panel of the car enclosure. It shall be positioned such that top passenger use device floor button shall be not more than 48 inches above the finished floor.

B. All terminology on main car operating panel and auxiliary panel shall be raised or engraved. Use 1/8-inch letters to identify all other devices in upper section of the main car operating panel. The handicapped marking contrasting background shall be recessed .030 inch in a square or rectangular shape, in the faceplate, with the finished face of the 1/2 inch high numeral and Braille markings flush with the finished faceplate. The numerals and markings shall be integrated with the faceplates. Applied plates are unacceptable. Engrave number of elevator, one inch high, in upper part of car panel.

C. Two-section flush panel shall have lower section recessed and fitted with hinged doors. Door of lower section shall have concealed hinges and shall be in same front plane as lower section and shall be fitted with cylinder type, key operated lock. Two-section panel shall have one piece faceplate.

1. The upper section shall contain:

a. A complete set of minimum one-inch diameter LED white light illuminated push buttons corresponding to the floors served. Lights shall extinguish when the car stops at a given floor. Each call button shall be legibly and indelibly identified by floor number not less than ½ inch high in the face of each call button.

b. Keyed emergency stop switch (red in color).

c. Emergency signal alarm bell button (red in color) conspicuously located to minimize accidental activation.

d. Two-position, key-operated INDEPENDENT SERVICE switch marked "INDEPENDENT SERVICE" with two positions marked "OFF" and "ON".

e. The three position, key-operated FIRE SERVICE switch marked "FIRE SERVICE" with three positions marked "OFF", "HOLD" and "ON". Adjacent to the FIRE SERVICE switch, provide a series of vertical lines engraved and filled

with red translucent material or fire hat which shall illuminate when required on FIRE SERVICE operation.

f. Engrave fire service operation signage on car operating panel.

g. A buzzer for FIRE SERVICE operation.

h. Door "OPEN" and door "CLOSE" buttons located below the car buttons. The door "OPEN" button shall be located adjacent to the car door entrance column.

i. An emergency “PUSH TO TALK” button for auto dial system. Engrave “PUSH TO TALK” over button. Engraving shall be 1/4 inch.

j. Provide a “Door Hold” button on faceplate. It shall have “Door Hold” engraved on button. Button shall light when activated. When activated, the door shall stay open for a maximum of 1 minute. To over ride door hold timer, push car operating panel floor call button.

k. Provide an emergency car lighting system on each car, consisting of a rechargeable battery, charger, controls, and LED light fixture. The system shall automatically provide emergency light in the car upon failure or abnormal interruption of the normal car lighting service, and function irrespective of the position of the light control switch in the car. The system shall be capable of maintaining a minimum illumination of 1.0 foot-candle when measure 4 feet above the car floor, and approximately one foot in front of the car operating panel, for a period of not less than four hours. Emergency light shall be located in main car operating panel.

2. The lower section shall contain:

a. Toggle switch for controlling interior car lighting.

b. Three position toggle switch (high, low and off) for controlling car ventilating blower.

c. Two position toggle inspection switch that will disconnect normal operation, activate hoistway access switches at terminal landings. Switch shall be marked "INSPECTION" with two-positions marked "ON" and "OFF".

d. Two position, spring return toggle switch or push button to test the emergency light and alarm bell. It shall be labeled “Test emergency light and bell”.

3. The emergency stop switch and emergency signal bell button shall be located below the car operating buttons.

a. Red emergency keyed stop switch, when operated, shall interrupt power supply, stop car independently of regular operating device. Car calls shall remain registered and car shall answer them when stop switch is reset. Emergency stop switch markings shall include clear indications for both the "STOP" and "RUN" positions.

b. Emergency signal alarm bell button shall be connected to a six-inch vibrating bell located on top or bottom of car.

C. Submit design of main car panel for approval.

2.31 AUXILIARY CAR OPERATING PANEL: INSTALL NEW

A. Provide an auxiliary car operating in the side wall panel. The auxiliary car operating panel shall contain only those controls essential to passenger operation.

1. Mount red emergency signal alarm bell button, door “open” and “close” buttons in an easily identifiable group with stop switch and alarm bell button mounted at a point no closer than 35 inches to the finished floor.

2. Complete set of LED illuminated pushbuttons with a minimum diameter of 1 inch. Buttons shall have the floor designations indelibly marked corresponding to the numbers of the main car operating.

3. Cross-connect all buttons in the auxiliary car operating panel to their respective buttons in the main car operating panel. Registration of a car call in either panel shall cause the corresponding button to illuminate in both the main and auxiliary car operating panels.

4. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with non-corrosive stainless steel spanner head or Bristol head tamperproof screws.

5. Submit design of auxiliary car operating panel for approval.

6. Install an “Emergency, Push to Talk” button for auto dial system. Engrave “PUSH TO TALK” over button. Engraving shall be 1/4 inch high.

7. Install auto dial phone system in auxiliary car operating panel.

2.32 SINGLE CAR SELECTIVE COLLECTIVE AUTOMATIC OPERATION

A. Provide single car selective collective automatic operation for passenger elevator E-4.

B. Operate car without attendant from pushbuttons in car and located at each floor. When car is available, automatically start car dispatch it to floor corresponding to registered car or hall call. Once car starts, respond to registered calls in direction of travel in order floors are reached. Does not reverse car direction until all car calls have been answered or until all hall calls ahead of car and corresponding to direction of car travel have been answered. Slow car and stop automatically at floors corresponding to registered calls, in the order in which they are approached in either direction of travel. As slowdown is initiated for a hall call, automatically cancel hall call. Cancel car calls in same manner. Hold car at arrival floor an adjustable time interval to allow passenger transfer. Answer calls corresponding to travel direction of car unless call in the opposite direction is highest or lowest call registered. Illuminate appropriate pushbutton to indicate call registration. Extinguish light when call is answered.

C. When all calls in the system have been satisfied, the elevator shall shut down at the last landing served with the car and hoistway doors closed. Registration of a call at the landing where the car is parked shall automatically open the car and hoistway doors. Provide a predetermined time delay to permit passengers entering the parked car to register the call of their choice and establish direction of travel before the system can respond to landing calls registered at the same time above or below the parked car.

2.33 INDEPENDENT SERVICE

A. A two-position key operated "INDEPENDENT SERVICE" switch shall be provided in the main car operating panel that shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls registered on its car dispatch and shall bypass all calls registered on landing push buttons. Car and hoistway doors shall not close until a car button or the "DOOR CLOSE" button is pressed and held until interlock circuits are made up. When switch is returned to "OFF" position, normal service shall be resumed. In addition, the elevator shall be disconnected from the automatic dispatching system and the hall lanterns and the highest call reversal shall not be effective. The other car shall respond to all hall calls.

2.34 FIRE SERVICE: INSTALL NEW

A. Provide fire service as per the ASME A17.1 Code 2005 edition.

B. Smoke Detectors:

1. Install smoke detector devices that are designated for actuating the Elevator Phase I “FIRE SERVICE” response in each elevator lobby, top of hoistway, and machine room.

a. Elevator lobby smoke detectors shall activate only the elevators sharing the hoistway or common lobby.

b. Upon activation of an elevator lobby, top of hoistway, or machine room smoke detection device, a signal shall be transmitted to the building fire alarm control console. The “ALARM” signal shall be transmitted from the console to the elevators which shall activate the “FIRE SERVICE PHASE I” operation. The “ALARM” signal that is received from any elevator lobby, top of hoistway, or machine room smoke detection device except the device located in the main lobby, shall send the elevator to the designated main floor. The Main Lobby device shall send the elevator to the alternate floor.

c. When an “ALARM” signal initiates Phase I operation, momentary movement of the “FIRE SERVICE” key in the lobby control panel to the “BYPASS” position shall be required to return elevators to automatic operation if “ALARM” signal is cleared.

d. Provide new fire service key switch in first floor push button plate.

C. First floor is main floor, second floor is alternate floor.

2.35 SHUNT TRIP CIRCUIT BREAKER and HEAT DETECTORS

A. Reuse shunt trip circuit breaker or install a new one in the elevator machine room.

B. Heat detectors shall be installed within 24 inches of each sprinkler head. They shall be 135 degree rated compensation heat detectors. Provide wiring from machine room heat detectors to fire alarm panel and back to 110V (AC) switch for each circuit breaker.

C. The heat detectors shall be connected to the fire alarm control panel. When activated by the heat detectors, the fire alarm control panel shall a supervised signal to the elevator machine room in the form of a relay with a set of 110 Volt “C” contacts for each elevator. The 110 Volt circuit is to be on emergency power system. The relay shall be located in the machine room. Power shall be removed from each elevator controller by activating an independently controlled shunt trip circuit when the temperature in the machine room exceeds the setting of the heat detector.

D. The heat detector shall be independent of the fire service system.

2.36 CAR POSITION INDICATOR: NEW

A. Provide an L.E.D. digital type of car position indicator. Locate in new main car operating panel. Remove existing car position indicator. Provide matching stainless steel to cover existing position indicator box area. L.E.D. digital readouts for floor numbers and direction arrows shall be a minimum of 2 inches high.

2.37 HALL POSITION INDICATOR: NEW

A. Remove all existing hall position indicators and hall lanterns at all floors. Provide new L.E.D. digital type hall position indicators. L.E.D. digital readouts shall be a minimum of 2 inches high for direction arrows and floor numbers. Provide separate arrival arrows for up and down direction. Provide white for up and red for down. Provide new wiring. Install cover plate to cover all of existing hole.

B. Corridor position indicator shall be equipped with a clearly audible electronic chime which shall sound once for “UPWARD” bound car and twice for

“DOWNWARD” bound car. Audible signal shall not sound when a car passes the floor without stopping.

2.38 HOISTWAY ACCESS SWITCHES: INSTALL NEW

A. Provide hoistway access switch for elevator at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. When side slide doors are specified, mount the access key switch 1800 mm (6 feet) above the corridor floor next to the strike jamb. The exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate "UP", "DOWN", and "OFF" positions. Submit design and location of access switches for approval. Each access switch shall be a constant pressure cylinder type lock having not less than five pins of five stainless steel disc combination with key removable only when switch is in the "OFF" position. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose in the hospital. Arrange the hoistway switch to initiate and maintain movement of the car. When the car is moved down from the top terminal landing, limit the zone of travel to a distance not greater than the height of the car crosshead.

B. Provide emergency keyways for all hoistway entrances.

2.39 HOISTWAY ENTRANCES: REUSE

A. Refinish existing stainless steel entrance frames.

B. Clean and reuse existing sills, hanger supports, strut angles, fascia plates and toe guard. Install new doors, tracks, gibs, door rollers and interlocks.

C. Replace existing pick up and release rollers. Add Spirator to each set of doors to help closer or replace existing closers.

D. Reuse Braille plates on both sides of door frame entrances. Locate at 60 inches center line.

2.40 ELECTRIC POWER DOOR OPERATORS: REMOVE EXISTING AND INSTALL NEW

A. Provide a Closed Loop High Performance Door Operator to automatically open the car and hoistway doors simultaneously when the car is level and automatically close the doors simultaneously at the expiration of the open timing. Motor shall be of the high-internal resistance type, capable of withstanding high currents resulting from stall without damage to the motor. The door operator shall be capable of opening a car door and hoistway door simultaneously at a maximum speed of not less than 2 feet per second. The closing speed shall be one foot per second. A reversal of direction of the doors from the closing to opening operation whether initiated by the infrared curtain unit, or the door open button, shall be accomplished within no more than 1-1/2 inches of door movement. Particular emphasis is to be placed on obtaining quiet interlock and door operation and smooth, fast, dynamic braking for door reversals and stopping of the doors at both extremes of travel. All levers operating the doors shall be constructed of heavy steel members and all pivot points shall have ball or roller bearings. Electric power shall be used to open and close the doors. Springs may be used for auxiliary automatic door closers required under Rule 2.11.3 of the Code.

B. Provide new door clutch, gate switch, door header, track, arms and related door equipment.

C. Door operator shall open and close both car and hoistway door simultaneously. Inherent design and installation of door operating devices shall be such as to preclude possibility of any hoistway door panel being disengaged from operating devices under any condition of operation of cars. Doors shall open automatically when car has stopped at landing. Doors shall be synchronized with operation of leveling car and opening car and hoistway doors simultaneously. Car and hoistway doors shall close automatically after

an adjustable predetermined time sufficient to allow passengers to enter and leave the car. Before the interlock circuit is established, hoistway door for landing shall lock and remain in closed position until the car makes another stop at that landing.

D. Door shall operate smoothly and without slam in opening and closing directions and shall be cushioned in final movement in each direction of travel by regulated and adjustable electric power or other equally effective means. No electrical power shall be required to hold doors either open or closed. Hoistway doors shall be provided with door closers arranged to close open doors automatically if car for any reason leaves landing zone. In case of interruption or failure of electric power, mechanism shall permit manual opening from within car at door zone only. Door operator shall operate in conjunction with, incorporate in its design, or be equipped with interlocks or safety switches. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone. Elevator, when out of the leveling zone, is restricted to 4 inch opening. Provide door locking device as per code.

E. Install new infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully open position should the unit be actuated while the doors are closing. Curtain unit shall function at all times when the doors are not closed, irrespective of all other operating features.

F. Should the doors be prevented from closing for more than a predetermined adjustable interval of 20 to 60 seconds by operation of the curtain unit or door open button, these devices shall be rendered unable to cause door reversals, the doors shall stay open and the audio voice message and a buzzer located on the car shall sound. Provide door nudging.

G. Provide car and hoistway door open and close buttons. When the door open button is pressed, the doors, if in the open position, shall remain open, or if the doors are closing, they shall stop, reverse and re-open. Momentary pressure of the door close button shall initiate the closing of the doors prior to the expiration of the normal door open time. The open and close buttons shall be located in the car operating station below the floor buttons. The door open button shall be located adjacent to the door opening.

H. Should the doors be prevented from closing by an obstruction, that does not activate a door re-opening device, for more than an adjustable interval of 15 to 60 seconds, the doors shall automatically reverse to the fully opened position.

2.41 ELECTRIC INTERLOCKS: INSTALL NEW

A. Equip each hoistway door with a new lock and interlock contacts to prevent operation of car until all hoistway doors are locked the in closed position as defines by code. Interlocks shall prevent opening of hoistway doors from corridor side, unless car is at rest at landing, is operating in leveling zone at landing or hoistway access is used.

B. Hoistway interlocks shall not be accepted unless it has successfully met requirements of Section 2.12 of the A17.1 Code. Retiring cams or other approved devices shall be securely fastened to the car and shall be arranged to operate the interlocks without objectionable noise, shock or vibration.

C. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equal.

D. Equip car doors with electric contact which prevents operation of car until door is closed as defined in the Code, unless car is operating in leveling zone or hoistway access is used. Locate door contact to prevent its being tampered with from inside the car. Car door contact shall not be accepted unless it has successfully met requirements of Section 2.12 of the Code.

E. Provide devices, either mechanical or electrical, which shall prevent operation of the elevator in the event of an accident to or defective door operator equipment has permitted an independent door panel to remain in the “UNCLOSED” or “UNLOCKED” position.

2.42 CAR SLING: REUSE EXISTING CAR SLINGS

A. Present car frame shall be checked for proper alignment and corrected if necessary. All bolt connections shall be checked, tightened or replaced where necessary.

2.43 ROLLER GUIDES FOR CAR AND COUNTERWEIGHT: INSTALL NEW

A. Provide car and counterweight with adjustable roller guides.

B. Each guide shall be of an approved type consisting of not less than three (3) wheels, each with a durable, resilient oil-resistant material tire rotating on ball bearings having sealed-in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. Secure the roller guides at top and bottom on each side of car frame and counterweight frame. All mounting bolts shall be fitted with nuts, flat washers, split lock washers and if required, beveled washers.

C. Minimum diameter of counterweight rollers shall not be less than (75 mm) 3 inches. Properly balance counterweight frame to equalize pressure on all guide rollers. The Contractor shall have the option of furnishing, for counterweight only, mechanically adjusted roller guide in lieu of spring loaded roller guides as specified.

D. Minimum diameter of car rollers shall not be less than 150 mm (6 inches) unless the six roller type is used. The entire elevator car shall be properly balanced to equalize pressure on all guide rollers. Cars shall be balanced in post-wise and front-to-back directions. Test for this balanced condition shall be witnessed at time of final inspection.

E. Equip the car and counterweight with an auxiliary guiding device for each guide shoe that shall prevent the car or counterweight from leaving the rails in the event that the normal guides are fractured. These auxiliary guides shall not, during normal operation, touch the guiding surfaces of the rails. Fabricate the auxiliary guides from hot rolled steel plate and mount between the normal guide shoes and the car and counterweight frames. The auxiliary guides may be an extension of the normal guide shoe mounting plate if that plate is fabricated from hot rolled steel. The portion of the auxiliary guide which shall come in contact with the rail guiding surfaces in the event of loss of the normal guides shall be lined with an approved bearing material to minimize damage to the rail guiding surfaces. Submit design for approval.

2.44 CAR PLATFORM FOR PASSENGER ELEVATORS: REUSE EXISTING

A. Reuse existing platforms. Passenger elevators shall have new flooring not less than 1/8 inch thick. Type and color shall be submitted for selection by COTR. Adhesive material shall be the type recommended by the manufacturer of the flooring.

B. Platform guard (toe guard) shall meet the requirements of Section 2.15.9 ASME A17.1 2005.

C. Install new load weighting device.

2.45 CAR ENCLOSURE FOR ELEVATORS

A. Reuse existing cab. Install new side and rear panels made of Stainless Steel from floor to 48 inches above floor. Side and rear panels 48 inches from

finished floor shall be covered with new plastic laminate. Apply the plastic laminate to a minimum ½ inch fire rated particle board that meets ASME and Federal requirements. Submit a method of fastening particle board to steel. The particle board shall be one piece on back and side walls. Color and type shall be selected by COTR.

B. Side and rear wall panels above the stainless steel wainscot shall be faced with high pressure plastic laminate. All joints shall be smooth and flush, with no ragged or broken edges.

C. Provide new fluorescent car lights, 4 sets, four ft. long, two lights each, T-8 bulbs and electronic ballasts.

D. Install new drop ceiling and plastic inserts. The color and type shall be selected by COTR. Provide car enclosure with two sets of stainless steel handrails.

E. Move existing handrail and refinish to match new handrail or install two new handrails.

1. 75 mm (3 inches) wide by 9 mm (.35 inches) thick flat stock located with centerlines 750 mm and 1050 mm (30 inches and 42 inches) above the car floor.

2. Locate handrails approximately 38 mm (1 ½ inch) from cab wall. Install handrails on two side and rear walls. Curve ends of handrails to walls. Conceal all handrail fastenings. Handrails shall be removable from inside the car enclosure.

F. Repaint dome of cab bright white.

G. Provide new stainless steel car doors. Construct door panels to be flush hollow construction, not less than one inch thick, consisting of not less than one piece continuous 16 gauge stainless steel on car face side and leading and trailing edges. Separate by two plates of sound deadening material and reinforced steel shapes welded to the plates at frequent intervals. Reinforce panels as required for installation of hangers, power operating and door operating devices. Hang door on two point suspension hangers having ball bearing sheaves not less than three inches in diameter with rubber or non-metallic sound reducing tires. Equip hanger with adjustable ball bearing rollers to take up thrust of panels. Up thrust shall be capable of being locked in position after adjustments to maximum of 0.015 inch clearance. Provide two non-metallic door gibs on each door panel. Gibs shall be replaceable without removing of door panel.

H. Provide a stainless steel capacity plate in each elevator car. Capacity plate shall be conspicuously located on the front return panel containing the main car operating panel. Plate shall show the rated capacity of the elevator in pounds with engraved or cast letters not less than 1/4-inch high. Engraved letters shall be filled with black paint. The capacity may be engraved in the main car operating panel faceplate in lieu of a separate capacity plate

I. Remove existing cab emergency lights. Cover hole with stainless steel plate. Provide new emergency car lighting system located in new main car operating panel.

J. Install new GFI electrical outlet in front cab wall below main car operating panel.

K. Reuse emergency exit switch. Install new wire.

L. Provide new 2 speed car top fan.

2.46 AUTO DIAL SYSTEM: NEW

A. Remove existing phone or intercom system located in the cab.

B. Auto dial system shall be provided for each elevator to replace existing phone system. Each auto dial shall have a separate number. Locate auto dial

system in auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless steel cover plate. The words “Telephone, Push to Talk” shall be engraved in ¼ inch letters. When activated by the “PUSH TO TALK” button, the auto dial system shall automatically dial an emergency service number that is monitored 24 hours a day.

PART 3 - EXECUTION

3.1 SPACE CONDITIONS

A. The elevator machine room shall comply with Sections 3.7 and 2.7 of the ASME A17.1 Code 2005 edition.

B. Attention is called to existing overhead clearances, pit clearances, overall spaces available in hoistway and machine room and machine room environmental conditions in connection with completion of specified elevator work. Provide proper, satisfactory and code legal installation of equipment as a whole, including all construction, accessories, and devices in connection with elevator, mechanical and electrical work specified herein.

C. Any construction changes or relocation of equipment, conduit, wiring, etc., required to accomplish the specified elevator installation must be arranged and obtained by the contractor, subject to the approval of the Contracting officer. Cost of such changes shall be included in the base bid and shall form a part of the contract.

3.2 ARRANGEMENT OF EQUIPMENT

A. Clearance around elevator, mechanical and electrical equipment shall comply with applicable provisions of NEC. Arrange equipment in machine room so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same machine room. Where applicable, locate controller near and visible to its respective hoisting machine.

3.3 WORKMANSHIP AND PROTECTION

A. All installations shall be made in a first class, neat and skillful manner by mechanics experienced in the trade involved. All details of the installation shall be mechanically and electrically correct. All materials and equipment shall be new and without imperfections.

B. Recesses, cutouts, slots, holes, patching, grouting, refinishing and the like to accommodate installation of equipment shall be included in the contractor's work. All new holes in concrete shall be core drilled.

C. No structural members shall be cut or altered. Work in place which is damaged or defaced shall be restored equal to original condition.

D. Finished work shall be straight, level and plumb, with true, sharp surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.

E. Sleeves for all conduit and other small holes shall project two inches above concrete slabs.

F. Where beams, slabs, or other building construction protrude more than two (2) inches into the hoistway, all top surfaces shall be leveled with 20 gauge steel at an angle of at least 75 degrees to the horizontal.

G. Contractor shall provide and maintain adequate fire extinguishers on site and in the areas where welding or cutting is to occur.

H. Provide screening between hoistways during construction.

3.4 PRETESTS AND TESTS

Pretest, as per specification, the elevators and related equipment, in the presence of the COTR for proper operation before requesting final inspection.

A. Procedure outlined in the "Practice for Inspection of Elevators, Escalators and Moving Walks (Inspectors Manual)' ANSI A17.2 shall apply.

1. Final test shall be conducted in the presence of and witnessed by the Veterans Administration Consulting Support Office (00CFM3A), Elevator Engineers.

2. Government shall furnish electric power including necessary current for starting, testing and operating machinery of each elevator.

B. If required by the Veterans Administration elevator engineer, inspection shall be conducted at other than normal working hours.

1. Contractor shall furnish the following test instruments and materials on-site and at the designate time of inspection: properly marked testing weights, voltmeter, center-reading amp meter, thermometer, stopwatch, direct reading tachometer and a set of "walkie-talkies".

2. If during the inspection process, the Department of Veterans Affairs representatives determine the need; the following instruments should be available within a four-hour period: megohm meter, vibration meter, sound meter and a light meter.

C. Inspection shall be made of workmanship and equipment furnished and installed for compliance with specification.

D. Balance Tests: The percent of counterbalance shall be checked by placing test weights in car until the car and counterweight are equal in weight when located at the mid-point of travel. If the actual percent of counterbalance does not conform to the specification, the amount of counterweight shall be adjusted until conformance is reached.

E. Full Load Run Test: Elevators shall be tested for a period of one hour continuous run with full contract load in the car. During the test run the car shall stop at all floors in both directions of travel and stand for not less than five and more than 10 seconds per floor.

F. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with full contract load and no load in the elevator. Speed tests shall be made before the full load run test and after the full load run test. Speed shall be determined by applying a tachometer to the car hoisting ropes and/or governor rope. The actual measured speed of the elevator with all loads in either direction shall be within five percent of specified rated speed.

1. Full speed runs shall be quiet and free from vibration and sway. When cars are standing at the floor with doors open, they shall remain fully stopped with hoisting machine brake applied.

G. Temperature Rise Test: The temperature rise of the hoisting motor shall be determined during the full load test run. Temperatures shall be measured by the use of thermometers inserted into the various windings. Under these conditions, the temperature rise of the equipment shall not exceed 50 degrees Centigrade above ambient temperature. Test shall be started only when all parts of equipment are within five degrees Centigrade of the ambient temperature at time of starting test. Other tests for heat runs on motors shall be as specified in the latest procedure of the Institute of Electrical and Electronic Engineers.

H. Check amp readings with empty, balanced, and full load. At full load, the amp readings shall not exceed the motor nameplate amperage.

I. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car, balanced load in car

and with contract load in car, in both directions of travel. Accuracy of floor leveling shall be within plus or minus 1/8 inch of level with any landing floor for which the stop has been initiated (with a definite range of distance in advance of the landing) regardless of load in car or direction of travel. The car leveling device shall automatically correct over travel as well as under travel and shall maintain the car floor within plus or minus 1/8 inch or level with the landing floor regardless of change in load.

J. Brake Test: The action of the brake shall be prompt and a smooth stop shall result in down direction with no load up to and including 125 percent of contract load in the car. Up travel not required.

K. Insulation Resistance Test: The elevator's complete wiring system shall be free from short circuits and grounds and the insulation resistance of the system shall be determined by the use of a megohmmeter, at the discretion of the Veterans Administration representative conducting the test.

L. Safety Devices and Governor Tests: The safety devices and governor shall be tested as required by Rule 8.10.2 of the Code.

M. If equipment fails, test requirements and re-inspection is required. The Contractor shall be responsible for costs of re-inspection, including salaries, transportation expenses and other expenses of the representatives of the COTR.

N. Limit Stops:

1. The position of the car when stopped by each of the normal limit stops with contract load in the car shall be accurately measured. The car shall reach the terminal landings under the above condition.

2. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at contract speed for both tests. Normal limit stopping devices shall be inoperative for the tests.

O. Oil Buffer Tests: These tests shall be conducted with operating device and limit stops inoperative and with contract load in the elevator for the car buffer and with no load in the elevator for the counterweight buffer. Preliminary test shall be made at the lowest (leveling) speed. Actual tests shall be conducted at contract speed. Buffers shall compress and return to the fully extended position without oil leakage.

P. Setting of Car Door Contacts: The position of the car door at which the elevator may be started shall be measured. The distance from full closure shall not exceed that required by the Code. The test shall be made with the hoistway doors closed or the hoistway door contact inoperative.

Q. Setting of Interlocks: The position of the hoistway door at which the elevator may be started shall be measured and shall not exceed the Code Requirements.

R. Operating and Signal System: The elevator shall be operated by the operating devices provided and the operation signals and automatic floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration or deceleration. Stopping shall be without bumps or jars.

S. Performance of the elevator dispatching system shall be witnessed and approved by the COTR’s representative.

3.5 PAINTING AND FINISHING

A. Controllers and all other uncoated ferrous metal items shall be painted not less than one factory priming coat or approved equal.

B. Upon completion of installation and prior to final inspection, all equipment shall be thoroughly cleaned of grease, oil, cement, plaster and other debris. All equipment, except that otherwise specified as to architectural finish, shall then be given two coats of paint of approved color, conforming to manufacturer's standard.

C. No field painting of governors shall be permitted.

D. Paint floor designation not less than four inches high on hoistway doors, fascias and/or walls as required by Rule 2.29.2 of the Code. The color of paint used shall contrast with the color of the surfaces to which it is applied.

E. Elevator hoistway machines, controllers and selectors shall be identified by 4-inch high numbers located as directed. Governors, shunt trip circuit breakers, safety plank and cross heads of cars shall be identified by 4-inch high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be stenciled.

F. Surface of door frames, door panels, interior cab surfaces, etc., that become damaged or marred during renovations shall be restored to original condition in a satisfactory manner before final acceptance of work.

3.6 INSTRUCTION OF PERSONNEL

A. Provide competent instructors to train VA personnel in operation of the equipment and accessories installed under this contract, for a period of not less than eight hours. Instruction shall commence after completion of all work and at such time as directed by the COTR. Training shall be conducted between the hours of 8:00 AM and 4:30 PM.

B. In addition to oral instruction, written instructions in triplicate relative to car, adjustment and operation of all equipment and accessories shall be furnished and delivered to the COTR in independently bound folders. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electric apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts lists with descriptive literature and identification and diagrammatic cuts of equipment and parts.

C. Provide any supplementary instruction for adjustment and care of new equipment that may become necessary because of changes, modification and/or replacement of equipment or operation under requirements of paragraph entitled "GUARANTEE".

3.7 INSPECTIONS AND MAINTENANCE SERVICE

A. Furnish complete maintenance and inspection service on entire elevator systems. The modernized elevator systems shall be guaranteed for a period of one (1) year, beginning with the completion and acceptance by the COTR of the last elevator. Maintenance work shall be performed by skilled elevator personnel directly employed and supervised by the same company that furnished and installed the elevator equipment specified herein.

B. This contract will cover full maintenance, which includes emergency call back service, inspections and preventive maintenance of each of the elevators listed in the contract. The Contractor shall be required to perform WEEKLY inspections during the one year maintenance period. During the inspection visit, the Contractor shall clean, adjust and lubricate the equipment. Determine the nature and extent of any trouble required to restore the elevators to satisfactory service, and if conditions warrant, furnish and install parts.

C. When required, motors, controllers, relay panels, selectors, leveling devices, operating devices, switches, in car and in hoistways, hoistway door and car door or gate operating device, interlock-contacts, guide shoes, guide

rails, car door sills, hangers for doors, car doors or gates, signal system, car safety device, governors, tension and sheaves in pit shall be cleaned, lubricated and adjusted. Hoist motor brushes shall be checked for wear at least every two weeks. Accumulated carbon shall be removed from the commutators, brush rigs and windings at the same time.

D. Furnish all lubricant, cleaning materials and parts required.

E. Cleaning Services: Guide rails, overhead sheaves and beams, counterweight frames, bottom of platforms and machine rooms floors shall be brushed cleaned at least once every four month. Car tops shall be cleaned monthly. All accumulated rubbish shall be removed from the pits monthly. A general cleaning of the entire installation including all machine room equipment and hoistway equipment shall be accomplished quarterly. Necessary cleaning supplies, vacuum cleaner, shall be furnished by the Contractor.

F. Adjustment Services: All hoistway ropes shall be examined and the tension shall be adjusted whenever necessary to insure maintenance of adequate safety factors.

G. Materials to be furnished: The Contractor shall furnish all lubricants, cleaning supplies and tools necessary to perform the work described above. All lubricants used shall be recommended by the manufacturer of the equipment.

H. This guarantee service shall not include the performance of any work required as a result of improper use, accidents, or negligence for which the contractor is not directly responsible.

I. Provide 24 hour emergency call-back service which shall consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency trouble develop between regular examinations. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of the equipment and persons in and about the elevator.

J. Service and emergency personnel shall report to the COTR or his authorized representative upon arrival at the medical center and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed shall be given to the COTR.

K. The contractor shall maintain a log in the Elevator Machine Room. The log shall list the date and time of all routine examinations and all trouble calls. Each trouble call shall be fully described including the nature of the call, necessary correction performed or parts replaced.

L. When arriving on site to start elevator renovation, the Elevator contractor shall start to maintain elevator E-4 during renovation period. This will be a no billable cost to the VAMC. This maintenance period shall be included in the renovation bid. This is separate from the one year maintenance contract which starts with the completion of project.

--- END ---

VAMC KERRVILLE, TX

PROJECT #671A4-07-111ES

BUILDING #96 ELEVATORS P1 & P2

SECTION 14226

MODERNIZATION OF HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section of the specification is intended to cover the complete furnishing of all labor, materials, engineering, tools and equipment required to furnish specified alterations and new components on hydraulic elevators, Building #96, Elevators P-1 and P-2 (duplex elevators).

1.2 ELEVATOR SERVICE

A. A maximum of one elevator may be removed from service at one time, unless prior arrangement is made with VA Contracting Officer's Technical Representative (COTR) to permit performance of work. All work on elevator vacated shall be completed, put into satisfactory operation, and accepted before work on next elevator is started. Prior to final acceptance, contractors shall complete all pertinent safety tests and inspections. Final inspection and tests shall be given only when all work on all elevators has been completed. Final contract acceptance shall be given only upon successful completion of final inspections and tests.

Premises shall be occupied during performance of work, but elevator contractor shall have uninterrupted use of scheduled elevator vacated for completion of work.

1.3 WORK SCHEDULE

A. Before work is started, submit prepared work schedule for approval and arrange with COTR sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways and elevators, location of temporary partitions, etc. The COTR must be notified fourteen (14) calendar days, in writing, in advance of starting work on elevators. No work may be begun on any elevator until all materials for that elevator have been delivered to the site and verified by the COTR. First elevator to be removed from service shall be designated by COTR.

1.4 SAFETY PRECAUTIONS

A. Building will be occupied during execution of work. Work shall be conducted in a manner to afford maximum protection of building, facilities, patients, employees and the public; and to prevent unreasonable delay or interference with normal functioning of hospital activities.

B. Provide fire extinguishers so that they shall be readily available at all times.

C. It shall be the obligation of the elevator contractor to maintain a free and clear passageway in each elevator lobby. Parts, tools, etc., shall be kept within the confines of entrance partitions and trash will be removed daily.

D. Provide flame retardant 5/8 inch drywall partition when contractor is chopping the walls or core drilling. Barrier shall extend to full height of the elevator lobby.

1.5 REMOVED MATERIALS AND EQUIPMENT

A. Materials that are required to be removed and not specified to be reused or retained under contract shall be removed from the site at the expense of the elevator contractor. Elevator contractor shall receive title to all materials and equipment required to be removed and not specified to be reused or retained, as of date of withdrawal of material from service by elevator contractor to complete required and scheduled work. Government does not warrant condition of said material to which elevator contractor shall obtain title, nor shall Government be liable for damage before or after title passes to elevator contractor.

1.6 APPLICABLE PUBLICATIONS

A. The following specifications and standards of the issues below (including the amendments, addenda, and errata designated) form a part of this specification to the extent indicated by the reference thereto. In text, such specification and standards are referred to by basic number or designation only.

1. Federal Specifications (Fed. Spec.):

J-C-580B(1) Cord; Flexible and Wire, Fixture(Electrical-600 volt service

W-C-596A(2) Connector, Plug, Electrical; Connector Receptacle, Electrical

W-F-406E Fitting for Cable, Power, Electrical and Conduit, Metal, Flexible

W-S-610(1)Splice, Conductor

ABS/UL 797 Conduit, Metal, Rigid; Electrical, Thin Wall Type(electrical metallic tubing); Straight Lengths, Elbows and Bends

WW-C-566C Conduit, Metal, Rigid; Coupling, Elbow and Nipple; Electrical Conduit- Zinc Coated

GAUGES: Sheet and Plate- U.S. Standard Wire: American Wire Gauge(AWG)

2. D1.1-92: American Welding Society (AWS)

3. IEEE: Institute of Electrical and Electronic Engineers.

4. NEMA: National Electrical Manufacturers Association

5. NFPA No. 252: Fire Tests of Door Assemblies

B. The following standards and codes of the issued listed below (including the latest amendments, addenda, and errata) form a part of this specification:

1. A17.1: 2007 American National Standards Institute (ANSI/ASME) Standards: Safety Code for Elevators and Escalators. In text, publication will be referred to as the Code.

2. A17.2: 2004 American National Standards Institute (ANSI) Standards: Practice for the Inspection of Elevators, Escalators and Moving Walks, Inspector's Manual.

3. NFPA No. 70: (Latest version) National Electrical Code. In text, the Code will be referred to as NEC.

4. Uniform Federal Accessibility Standards & VA Supplement to uniform Federal Accessibility Standards, 1988.

5. Americans with Disabilities Act, Latest edition with supplements.

6. NFPA 2009 Life Safety Code.

1.7 QUALIFICATIONS

A. Approval by the COTR is required of products or services of proposed manufacturer, suppliers and installers and will be contingent upon submission by the contractor of a certificate stating the following:

1. Manufacturer is currently and regularly engaged in modernization of elevator equipment as one of his principal products.

2. Installer has technical qualifications of at least five years of successful experience, trained supervisory and installation personnel, and facilities to install and/or modernize elevator equipment specified herein.

3. Proposed contractor shall submit a list of two or more prior hospital installations where all the elevator equipment he proposes to furnish on this project has performed satisfactorily together under conditions of normal use. The list shall include projects that have been in operation for a period of not less than two years preceding the date of these specifications, and will include the names and addresses of the medical center, and the names of the medical center administrators.

B. Approval of the contractor’s equipment will be contingent upon his having a permanent and satisfactory local maintenance service branch which shall render services within two hours of receipt of notification. Contractor shall submit the names and addresses of his authorized branch or service department which will render service to this installation, together with certification that the quantity and quality of replacement parts stock on hand is sufficient to guarantee continued operation of the elevator installation.

C. Elevator equipment shall not exceed a noise rating of 80 dB.

1.8 WIRING DIAGRAMS

A. Provide three complete sets of field wiring and straight line wiring diagrams showing all electrical circuits in the hoistway and in the machine room. One set framed under glass or on pivoted hard boards coated with an approved plastic sealer shall be mounted in elevator machine room as directed by COTR. In the event field modifications are found necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection. Corrected diagrams shall be delivered to the COTR within 30 days of final acceptance.

B. The following information relating to the specific type of microprocessor controls installed on this project shall be provided: (3 sets)

1. Owner’s information manual, containing general data on major components maintenance and adjustment.

2. System logic description.

3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and/or replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.

4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

1.9 ADDITIONAL EQUIPMENT

A. Additional equipment required to operate specified equipment manufactured shall be furnished and installed. The cost of such equipment shall be included in the base bid.

1.10 SAMPLES AND DESCRIPTIVE DATA

A. Materials shall be submitted singularly and separately and apart from materials specified under other Sections and shall be marked “SUBMITTED UNDER SECTION 14226,” in accordance with provisions of SECTION 01340, SAMPLES AND SHOP DRAWINGS. All submitted drawings and related elevator material shall be forwarded to South Texas Veterans Health Care System, Facilities Management room #138, 7400 Merton Minter Blvd., San Antonio, TX 78229, to the attention of Jeff Moore in order to perform a concurrent review.

B. Before executing any work, furnish information sufficient to evidence full compliance with contract requirements on proposed items. Such information shall include, as required, manufacturer’s name, trade names, model of catalog number, nameplate data (size, capacity, rating) and corresponding specification reference (federal or project specification number and paragraph).

C. Name of manufacturer, type or style designation and applicable data of the following equipment shall be shown on the elevator layouts:

Controller

1. Electric door operator; HP rating and RPM of motor.
2. Car operating panels.
3. Cab laminate.
4. Cab floor tile.
5. Hydraulic electric control valves.
6. Stainless steel hoistway and car doors.
7. Infrared curtain units.

Shop drawings:

1. Tank unit and pump motor.
2. Cuts or drawings of power door operator.
3. Hoistway door tracks, rollers, interlocks, pick up and release rollers.
4. Main and auxiliary car operating panels.
5. Hall position indicators and hall push buttons.
6. Furnish certificates as required under paragraph “Qualifications”.

1.11 PERFORMANCE STANDARDS

A. The elevators shall be capable of meeting the highest standards of the industry and specifically the following:

1. Contract speed shall mean speed in the UP and DOWN direction with empty, 50% and full capacity load in the car. Speed variation under any load condition, regardless of direction, shall be no more than 10 percent for hydraulic elevators.

2. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration. Stopping shall be without bumps or vibrations.

3. Full speed running shall be quiet and free from vibration and swaying. When cars are standing at the floor with doors open, they shall remain firmly stopped and shall not rock side to side.

4. Cars shall not move from side to side during the process of opening and closing the doors.

1.12 TOLERANCES

A. Floor Accuracy: Leveling control system, 1/8 inch above or below the floor.

1.13 GUARANTEE

A. The modernized elevator system shall be guaranteed for a period beginning with the completion and acceptance of the last traction and hydraulic elevator installation by the COTR. It shall be subject to terms of “GUARANTEE” articles of SECTION GENERAL CONDITIONS (except for length of guarantee). Upon receipt of notice from the Government of failure of any portion of materials and workmanship furnished, affected part or parts shall be replaced promptly with new parts by and at the expense of the contractor. No reused components shall be permitted. The guarantee period shall concur with the length of the maintenance contract.

B. If it becomes evident during the guarantee period that any device in not functioning properly or in accordance with specification requirements, or in the opinion of the COTR, excessive maintenance and attention must be employed to keep device operating, device shall be installed as part of work until satisfactory operation of installation is obtained. Period of guarantee shall start new from date of completion of new installation performed in accordance with foregoing requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Where stainless steel is specified, it shall be corrosion resisting steel complying with Fed. Spec. QQ-S-766, Class 302 or 304, condition A with Number 4 finish (150 grit) on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and all surfaces shall be perfectly smooth and without waves.

2.2 MANUFACTURED PRODUCTS

A. Materials, devices and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. Items not meeting this requirement, but which otherwise meet technical specifications and the merits of which can be established through reliable test reports or physical examination of representative samples, will be considered.

B. When two or more units of same class of materials, devices, or equipment are required, these units shall be products of one manufacturer.

C. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit.

1. All components of an assembled unit shall be products of the same manufacturer.

2. Parts which are alike shall be the product of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for the intended service.

D. If the elevator equipment to be installed is not known to the COTR, the contractor shall submit drawings in triplicate (three prints), for approval, showing all details or demonstrate to the satisfaction of the COTR that the equipment to be installed is in strict accordance to the specifications.

E. Welding at the project site shall be made by welder and welding operators who have previously qualified by test and prescribed in American Welding Society Publication AWS D1.1 to perform type of work required. A VA permit is necessary when welding or burning.

F. Motor nameplates shall state rated horsepower, speed, volts, amperes and other characteristics required by NEMA Standards and shall be securely attached to the item of equipment in a conspicuous location.

G. The elevator equipment, including controllers, door operators, relay panels, and supervisory system, shall be the product of one manufacturer of established reputation, except that any of the above items may be the product, either wholly or in part, of any manufacturer of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure a first class, safe and smooth operating system.

H. Where key operated switches are furnished in conjunction with any component of this elevator installation, furnish four (4) keys for each individual switch or lock. “Barrel type” keys shall not be used. Attach each key to a tag bearing a stamped or etched legend identifying its purpose.

I. Rated speed shall mean speed in either direction of travel with rated capacity load in car. Actual speed, under any load condition shall not vary more than 10 percent for hydraulic elevators.

2.3 SCOPE OF WORK

A. Scope of work to include renovation of the following hydraulic elevators.

B. Building #96, Elevators P-1 and P-2 (duplex). Rated load 5000 lbs, Speed 125 fpm, 23 feet 9.75 inches of travel.

1. New tanks, motors, pumps and control valves.
2. New controllers.
3. New shunt trip breakers.
4. Install smoke detectors at the top of hoistways, elevator lobbies and elevator pits.
5. Install new oil lines and fittings in Machine Room.
6. May reuse existing machine room duct.
7. Add sprinklers and heat detectors to elevator pits.
8. Provide all wiring for Phase I fire recall operation.
9. Reuse existing fascia and dust covers. Replace missing or damaged dust covers as needed.
10. Refinish stainless steel entrance frames.
11. New stainless steel doors, door tracks, door hangers, rollers and gibs.
12. New pickup and release roller assemblies.
13. New interlocks and lock-hawk assemblies.
14. May reuse existing hoistway duct.
15. New terminal limit switches top and bottom.
16. New traveling cables.
17. New hoistway wiring.
18. Remove existing Hall Lanterns.
19. New L.E.D. type Hall Push Button Fixtures.
20. Combination Position Indicator fixture at all floors.
21. New Fire Service (Phase I) key switch at 1st floor.
22. Reuse access key switches at top and bottom floors.

23. Remove existing car position indicator from car transom. Cover hole with stainless steel plate.

24. New Main and Auxiliary Car Operating Panels.

25. New digital car position indicator in main car operating panel.

26. New Emergency Light in main car panel.

27. New Capacity Plate.

28. Install new GFI outlet in cab.

29. New cab floor tile.

30. Reuse existing hand rails (Stainless Steel handrails 30’ and 42” to center above floor).

31. Remove cove light fixtures.

32. Paint ceiling of cab bright white.

33. Install new drop ceiling with new ceiling panels.

34. Install new cab lighting.

35. Reuse lower cab walls (from floor to 48” above floor). Install Laminate above to ceiling.

36. Install new Stainless Steel car doors.

37. New hands free phone in auxiliary car panel. Remove existing phone.

38. New Door operator, door equipment and door clutch.

39. New “PANA- 40 PLUS” (infrared curtain).

40. New Cartop Control Station, light and fan.

41. New emergency exit switches.

42. New Leveling unit.

43. New Light and GFI outlet on bottom of car.

44. New roller guides for top and bottom of car.

45. Reuse car sling.

46. Reuse buffers.

47. Install new automatic and manual shut off valves in pit.

48. New scavenger pumps.

50. New GFI outlets and Light Switches in pit(switch at top of ladders).

51. New Jack Packing(s).

52. New pit stop switches 48” above pit floor adjacent to pit ladder and 48” above pit floor.

2.4 POWER SUPPLY

Reuse existing power.

2.5 AUXILIARY POWER OPERATION: OPTION A or B

A. The control system for elevators P1 and P2 shall include provisions for operation on auxiliary power upon failure of the normal power supply.

1. The electrical contractor provides auxiliary power supply, including its starting means, transfer switch for transfer of elevator supply from normal to auxiliary power, a pair of conductors in a conduit from an auxiliary contact on the transfer switch (contact closed on normal power - open on auxiliary

power) to terminals on the elevator controller and other related work. If auxiliary power is not sufficient capacity to run all elevators, provide a timing relay from normal power to auxiliary power and another relay for delay back to normal power.

2. The elevator contractor shall provide equipment on elevator controllers and wiring between associated elevator controllers required to permit the elevators to operate as a group or one at a time.

B. Provide a “rescuvator” (battery pack) type system to lower the elevator to the lowest floor. Provide a power source to send the elevator to the lowest landing by activating the down valve. After the elevator has leveled at the lowest landing, provide power to open the car doors automatically. After a predetermined time the car doors shall close. Power shall be applied to the door open button so that doors can be opened from inside the elevator only. The elevator shall remain shut down at the bottom landing until normal power is restored. Install a sign on the controller indicating that power is applied to the down valve and door operator during loss of normal power.

2.6 GROUNDING

A. Equipment grounding shall be provided. Ground conductors supports, controller enclosure, motors, platform and car frames and other non-current conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, insulated and sized as required by NEC. Bond the grounding wires to each of the pull boxes, junction boxes, cabinets and other enclosures through which the wires pass.

2.7 CONDUIT, ETC.

A. Existing conduit that conforms to NEC may be reused. New conduit shall comply with the following paragraphs:

B. Unless otherwise specified or approved, all electrical conductors, except traveling cable connections to the car, shall be installed in rigid zinc-coated steel, electrical metallic tubing or metal wireways. All raceways completely embedded in concrete slabs or floor fill, shall be rigid steel conduit. Wireways and auxiliary gutters shall be in accordance with the applicable requirements of NEC and may be used between controller, starter and similar apparatus in the elevator machine room. Flexible metal conduit not less than 3/8 inch electrical trade size may be used, not exceeding 18 inches in length, for short connections between risers and limit switches, interlocks and for other applications permitted by NEC. Self supporting connections, where approved, shall be fully protected from abrasion or other mechanical injury. Flexible heavy-duty service cord, type SO, may be used between fixed car wiring and switches on car doors for curtain units.

C. All conduit and EMT terminating in steel cabinets, junction-boxes, wireways, switch boxes, outlet boxes and similar location shall have approved insulating bushings. If the bushings are constructed completely of insulating materials, a steel lock nut shall be installed under the bushing. At ends of conduits not terminating in steel cabinets or boxes, the conductors shall be protected by terminal fittings having an insulated opening for the conductors.

1. All openings in metal wireways shall be smooth and shall be insulated.

D. Conduit and EMT fittings and connectors using set screws or indentations as a means of attachment shall not be used.

E. Connect motors or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits. Certain existing conduits and ducts may be reused if they are code conforming and prior agreement is received from the VA COTR.

2.8 CONDUCTOR: NEW

A. Unless otherwise specified, conductors, exclusive of traveling cables, shall be stranded or solid coated annealed copper in accordance with Federal Spec. J-C-30 for either Type RHW or TRW. Where 16 and 18 AWG are permitted by NEC, either single conductor cable in accordance with Federal Spec. J-C-580 for Type TF or multi-conductor cable may be used, provided the insulation of single conductor cable may be, and outer jacket of multi-conductor cable is flame retardant and moisture resistant. Multi-conductor cable shall have color coding or other suitable identification for each conductor. Conductors for control board wiring, including wiring between main circuit resistors and control board wiring, shall be in accordance with NEC. No joints or splices will be permitted in wiring, except as outlets. Tap connectors may be used in wireways provided they meet all UL requirements.

B. All wiring must be test free from short circuits or grounds. Insulation resistance between individual external conductors and between conductors and ground shall be not less than one megohm.

C. Where size of conductors is not given, capacity shall be such that maximum current shall not exceed limits prescribed by NEC.

D. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors in accordance with Federal Spec. W-S-610. The contractor may at his option make these terminal connections on No. 10 or small conductors with approved terminal eyelets set on the conductor with a special setting tool or with an approved pressure type terminal block. Terminal blocks using pierce through serrated washers are not acceptable.

E. Install new wiring from shunt trip circuit breaker to new controller.

2.9 TRAVELING CABLES: NEW

A. All conductors to the car shall consist of flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on top of the car directly to controller. Junction boxes shall be equipped with terminal blocks. Terminal blocks having pressure wire connectors of the clamp type that meet UL 486 requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks shall have permanent indelible identifying numbers for each connection. Cables shall be securely anchored to avoid strain on individual terminal connections. Outer covering must remain intact between junction boxes, abrupt bending, twisting and/or distortion of the cables shall not be permitted.

B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than 4 spare conducts in each traveling cable.

C. Provide shielded traveling cable wire for the auto dial system within the traveling cable.

D. If needed, provide a twenty-four-inch wire hardware cloth shall be installed from each hoistway junction box downward to the elevator pit to prevent traveling cable from rubbing or chafing. Hardware cloth shall be securely fastened and tensioned to prevent buckling. Hardware cloth is not required when traveling cable is hung against a flush wall.

2.10 HYDRAULIC CONTROLLERS: MICROPROCESSOR CONTROL SYSTEM

A. The elevator contractor shall provide solid state components and printed circuit boards to control the hydraulic machine or signal functions. Provide complete details of the components and printed circuit boards, together with a complete operational description, shall be submitted for approval prior to manufacture. The controller shall be nonproprietary and no special tool, including a hand held testing tool shall be necessary for adjustments or

maintenance. The controller vendor shall be able to provide immediate tech support and be able to overnight mail any parts necessary for maintenance.

B. The controllers shall meet the requirements ASME A17.1.

2.11 PUMP UNIT ASSEMBLY - TANK, MOTOR, PUMP, CONTROL VALVE, ETC.

A. Completely integrate the pump unit for the control of the elevator. The unit shall consist of a hydraulic fluid pump driven by an induction motor together with oil control valves, piping, etc. Do not install hydraulic equipment within the storage tank. No submersible pump. Completely enclose unit on four open sides of the power unit frame with not less than 16 gauge steel removable panel sections. Fully line each panel section on the interior side with one inch rigid board or equivalent acoustical insulation.

B. Design hydraulic system so that working pressure does not exceed 500 psi under any loading condition.

C. Pump output shall be capable of lifting elevator with rated capacity load, with a speed variation of no more than 10% between no load and full load.

D. Motor shall be squirrel cage, drip proof, ball bearing, induction type, with a synchronous speed not in excess of 1800 rpm. Design motor specifically for elevator service, not to exceed nameplate full load current by more than 10% and be continuously rated at 120 starts per hour without exceeding a raise of 40 degrees C.

E. Provide reduced voltage starter with solid state controls.

F. Connect motor and pump with multiple V-belt. Size belts and sheaves for duty involved and design to prevent any metallic contact between motor and pump shaft.

G. Reuse existing jacks and pistons. Provide new jack packing for hydraulic elevators.

2.12 HYDRAULIC SYSTEM

A. Hydraulic fluid shall be of good grade to assure free flow when cool, and have minimum flash point of 400 degrees.

1. Provide a data plate on the tank framing indicating the characteristics of the hydraulic fluid used. Install new oil lines between the storage tank, pump, muffler, operating valves. Replace all oil line in the machine room space. Do not subject valves, piping, and fittings to working pressure greater than those recommended by the manufacturer.

B. Control valves shall have solenoid operation and arrange so hydraulic fluid flow will be controlled in positive and gradual manner to insure smooth starting and stopping of elevator.

C. Install new automatic shut-off valve in the oil supply line at the cylinder inlet, activate the automatic shut-off valve when there is a ten percent drop in no-load operating pressure. When activated, this device shall immediately stop the descent of the elevator, and hold the elevator unit it is lowered to use of the manual lowering feature of the valve. Arrange the manual lowering feature of the automatic shut-off valve to limit the maximum descending speed of the elevator to 15 FPM. The exposed adjustments of the automatic shut-off valve shall have their means of adjustment sealed after being set to their correct position. When new, weld to threaded pipe located at the jack head, do not use Victaulic fittings at jack head.

D. Install new scavenger pumps. Scavenger pumps shall have a copper tubing scavenger line with an electrically operated pump between the piston drip ring and oil storage tank. Scavenger line, pump, and strainers shall operate independently of hydraulic fluid pressure. Scavenger pump shall have a water

float designed to prevent operation of the pump, should the pit flood and shall be manually reset. Strap the pump and reservoir to the pit.

E. Provide all pump relief and other auxiliary valves to comply with the requirements of the Code to insure smooth, safe, and satisfactory operation of elevator.

F. Furnish and adjust by-pass and relief valve in accordance with Rule 3.19.4 of ASME A17.1.

G. Manual shut-off valves shall have a handle attached to the valves.

H. Conveniently locate the manual lowering valve, easily accessible, and properly identified with a red arrow and not concealed within the storage tank. Mark the operating handle in red.

I. Provide a low oil control feature which shall shut off the motor and pump and return the elevator to the lowest landing. Upon reaching the lowest landing the doors will open automatically allowing passengers to leave the car. Then doors shall close. All control buttons, except the door open button, shall be made ineffective.

2.13 CAR GUIDE RAILS

A. Retain existing car guide rails and brackets.

B. Thoroughly clean all guide rails of grease, oil, rust and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car and counterweight.

2.14 GUIDES FOR CAR: NEW ROLLER GUIDES

A. Install new adjustable roller guides.

B. Each guide shall be of an approved type consisting of not less than three (3) wheels, each with a durable, resilient oil-resistant material tire rotating on ball bearings having sealed-in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. Secure the roller guides at top and bottom on each side of car frame and counterweight frame. All mounting bolts shall be fitted with nuts, flat washers, split lock washers and if required, beveled washers.

C. Minimum diameter of the car rollers shall not be less than 150 mm (6 inches).

D. Equip the car with an auxiliary guiding device for each guide shoe which shall prevent the car from leaving the rails in the event that the normal guides are fractured. These auxiliary guides shall not, during normal operation, touch the guiding surfaces of the rails.

2.15 CAR BUFFERS

A. Reuse existing.

2.16 NORMAL AND FINAL TERMINAL STOPPING DEVICES: NEW

A. Provide new normal and final stopping devices they shall conform to the elevator code ASME A17.1.

2.17 TOP-OF-THE-CAR OPERATING DEVICE: NEW

A. The device shall conform to ASME A17.1.

B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked “INSPECTION” and ‘NORMAL” on the faceplate, with ¼ inch letters.

C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and safety button.

D. Provide an emergency stop toggle switch as specified in ASME A17.1.

E. Provide permanent identification for the operation of all components in the device.

F. The device shall be permanently attached to the elevator crosshead on the side of the elevator which is nearest the elevator hoistway doors.

2.18 CAR LEVELING DEVICE: NEW

A. Install new Car Leveling device.

B. Car shall be equipped with a two-way leveling device to automatically bring the car to within 1/8 inch of exact level with the landing regardless of load in car or direction.

C. Car shall, at all times, level into the floor and shall not stop above or below the floor and level back.

D. The automatic leveling device shall, within its zone, be entirely independent of the operating device and if the car stops short or travels beyond the floor, the leveling device shall automatically correct this condition and maintain the car within plus or minus 1/8 inch of level with the floor landing regardless of the load carried.

E. A car leveling device functioning through the medium of vacuum tubes or photoelectric tubes is not acceptable. Approved permanent magnet or electromagnetic leveling device is required.

2.19 WORK LIGHTS AND OUTLETS

A. Provide GFI protected duplex 3-wire grounded type receptacles and lamp, with wire guards on top of elevator car and beneath platform.

B. The receptacles shall be in accordance with Fed. Spec. W-C-596/12D for Style D7, 2-pole, 3-wire grounded type rated for 15 amperes and 125 volts.

2.20 EMERGENCY STOP TOGGLE SWITCHES

A. Emergency stop toggle switches shall conform to ASME A17.1.

B. Each stop switch shall be red in color and shall have its “Identity” and ‘STOP” and ‘RUN” positions legibly and indelibly identified.

C. Provide new pit switches (2). Switches shall meet ASME A17.1 code.

1. Locate switch 4ft. above pit floor adjacent to the pit ladder.

2. Locate switch 4ft. above bottom landing sill at the top of the pit ladder.

2.21 ELEVATOR CAR OPERATING PANELS: REMOVED EXISTING AND INSTALL NEW

A. New main car operating panels shall be located in the front wall panel of the car enclosure. It shall be positioned so the top passenger use device floor button shall be not more than 48 inches above the finished floor.

B. All terminology on main car operating panel and auxiliary panel shall be raised or engraved. Use 1/8-inch letters to identify all other devices in upper section of the main car operating panel. The handicapped marking contrasting background shall be recessed .030 inch in a square or rectangular shape, in the faceplate, with the finished face of the 1/2 inch high numeral and Braille markings flush with the finished faceplate. The numerals and markings shall be integrated with the faceplates. Applied plates are unacceptable. Engrave number of elevator, one inch high, in upper part of car panel.

C. Two-section flush panel shall have lower section recessed and fitted with hinged doors. Door of lower section shall have concealed hinges and shall be in same front plane as lower section and shall be fitted with cylinder type, key operated lock. Two-section panel shall have one piece faceplate.

1. The upper section shall contain:

a. A complete set of minimum one-inch diameter LED white light illuminated push buttons corresponding to the floors served. Lights shall extinguish when the car stops at a given floor. Each call button shall be legibly and indelibly identified by floor number not less than ½ inch high in the face of each call button.

b. Keyed emergency stop switch (red in color).

c. Emergency signal alarm bell button (red in color) conspicuously located to minimize accidental activation.

d. Two-position, key-operated INDEPENDENT SERVICE switch marked "INDEPENDENT SERVICE" with two positions marked "OFF" and "ON".

e. The three position, key-operated FIRE SERVICE switch marked "FIRE SERVICE" with three positions marked "OFF", "HOLD" and "ON". Adjacent to the FIRE SERVICE switch, provide a series of vertical lines engraved and filled with red translucent material or fire hat which shall illuminate when required on FIRE SERVICE operation.

f. Engrave fire service operation signage on car operating panel.

g. A buzzer for FIRE SERVICE operation.

h. Door "OPEN" and door "CLOSE" buttons located below the car buttons. The door "OPEN" button shall be located adjacent to the car door entrance column.

i. An emergency "PUSH TO TALK" button for auto dial system. Engrave "PUSH TO TALK" over button. Engraving shall be 1/4 inch.

j. Provide a "Door Hold" button on faceplate. It shall have "Door Hold" engraved on button. Button shall light when activated. When activated, the door shall stay open for a maximum of 1 minute. To over ride door hold timer, push car operating panel floor call button.

k. Provide an emergency car lighting system on each car, consisting of a rechargeable battery, charger, controls, and LED light fixture. The system shall automatically provide emergency light in the car upon failure or abnormal interruption of the normal car lighting service, and function irrespective of the position of the light control switch in the car. The system shall be capable of maintaining a minimum illumination of 1.0 foot-candle when measure 4 feet above the car floor, and approximately one foot in front of the car operating panel, for a period of not less than four hours. Emergency light shall be located in main car operating panel.

2. The lower section shall contain:

a. Toggle switch for controlling interior car lighting.

b. Three position toggle switch (high, low and off) for controlling car ventilating blower.

c. Two-position toggle inspection switch that will disconnect normal operation, activate hoistway access switches at terminal landings. Switch shall be marked "INSPECTION" with two-positions marked "ON" and "OFF".

d. Two position, spring return toggle switch or push button to test the emergency light and alarm bell. It shall be labeled "Test emergency light and bell".

3. Submit design of main car operating panel for approval.

2.22 INDEPENDENT SERVICE

A. Provide a two-position key operated "INDEPENDENT SERVICE" switch in the main car operating panel which shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls

registered on its car dispatch buttons and shall bypass all calls registered on landing push buttons. Car and hoistway doors shall not close until a car button or the “DOOR CLOSE” button is pressed and held until interlock circuits are made up.

2.23 CAR POSITION INDICATOR: NEW

A. Install the car position indicator in main car operating panel. Provide L.E.D. type digital read out. L.E.D. position indicator shall show floor and have direction arrow. Arrow and number shall be a minimum of 2 inches high.

B. Provide a stainless steel cover plate to cover old existing car position indicator hole.

2.24 AUXILIARY CAR OPERATING PANEL: STRIKE JAMB SIDE OF CAB BETWEEN HANDRAILS.

A. The auxiliary car operating panel shall contain only those controls essential to passenger operation.

1. Mount red emergency signal alarm bell button, door “OPEN” and door “CLOSE” buttons in an easily identifiable group with stop switch and the alarm bell button mounted at a point no closer than 35-inches to the finished floor and nearest the door jamb.

2. Complete set of LED white light bulbs illuminated push buttons with a minimum diameter of 1-inch. Buttons shall have the floor designation indelibly marked on their face using 1/2-inch characters, corresponding to the numbers of the main car operating buttons. Provide buttons in a compact vertical grouping for center opening doors and a horizontal group for two-speed doors. Provide Braille identification on car operating panel.

3. Cross-Connect all buttons in the auxiliary car operating panels to their respective buttons in the main car operating panel. Registration of a car call in either panel shall cause the corresponding button to illuminate in both the main and auxiliary car operating panels.

4. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with non-corrosive white metal spanner head or Bristol head tamperproof screws.

5. Submit design of auxiliary car operating panel for approval.

6. Install auto dial phone system in auxiliary car operating panel on all elevators.

7. Install an “Emergency Push to Talk” button for auto dial system in auxiliary car operating panel. Engrave “PUSH TO TALK” over button, minimum of ¼ inch engraving.

2.25 DUPLEX SELECTIVE CAR SELECTIVE COLLECTIVE AUTOMATIC OPERATION

A. Design system so that on operation of the dispatch button in the car is activated, the car shall start automatically, provided the hoistway door interlock and car door contact circuits have been established and shall stop at the first floor reached for which the call has been registered. Only one car shall respond to any one landing call and it shall be the car nearest to the call which is set to travel in corresponding direction of the registered call.

B. Arrange the system so that normally one car shall be parked at the main floor and the other car parked at the last landing served. Both cars shall park with their doors closed. The car parked at the main landing shall be considered the “parked” car and the other car shall be considered the “free” car. Should both cars complete their calls at the main landing, the car which arrives first shall be considered the free car.

C. If a car taken out of service for any reason, or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40 to 80 seconds, all calls shall be transferred to the other car which shall than function as a single car selective collective elevator until the “out of service” car is returned to service.

2.26 FIRE SERVICE

A. Provide Phase I Fire Service wiring and smoke detectors required by ASME A17.1.

B. Smoke Detectors

1. Provide smoke detection in each elevator lobby, machine room and at top of hoistway to activate Phase I fire service recall for elevators (P1 and P2). Furnish and install the smoke detection devices, together with all necessary conduits, wiring, relay, etc. required between the Fire Alarm System and the elevator machine room shall be furnished and installed under this section of the specification.

2. Upon activation of an elevator lobby, top of hoistway, and machine room smoke detection device, transmit a signal to the building fire alarm control console. Transmit an "Alarm" signal from the console to the elevators, which shall activate the "Fire Service" Phase I operation. The "Alarm" signal received from any elevator lobby, top of hoistway, or machine room smoke detection device, except that device located in the main lobby shall activate the same sequence of operation activated by the "Fire Service" key operated switch in the main lobby control panel. Together the "Alarm" signal received from the smoke detection device, located in the main landing lobby, shall activate the same sequence of operation activated by sending the elevator to the designated alternate floor.

3. First floor shall be main fire floor. Ground floor shall be alternate fire floor.

2.27 OPERATING DEVICE FACEPLATES: NEW

A. Fabricate faceplates for the elevator operating and signal devices from not less than 1/8 inch thick flat stainless steel with all edges beveled at least 15 degrees. Install all faceplates flush with surface upon which they are mounted.

B. Corridor push button faceplates shall cover existing push button plate area. The centerline of the landing push button fixtures shall be 42 inches above the corridor floor. Provide LED white light bulbs.

C. Fasten all car and corridor operating device and signal device faceplates with non-corrosive white metal spanner head or Bristol head tamperproof screws.

D. Design car and corridor push button face plates so that pressure on push buttons shall be independent of pressure on push button contacts.

E. Engraved legends in face plates shall have lettering ¼ inch high filled with black paint.

2.28 CORRIDOR POSITION INDICATORS: NEW COMBINATION FIXTURE

A. Remove all existing hall position indicators and hall lanterns at all floors. Provide new L.E.D. digital type hall position indicators. L.E.D. digital readouts shall be a minimum of 2 inches high for direction arrows and floor numbers. Provide separate arrival arrows for up and down direction. Provide white for up and red for down. Provide new wiring. Install cover plate to cover all of existing hole.

B. Corridor position indicator shall be equipped with a clearly audible electronic chime which shall sound once for “UPWARD” bound car and twice for

“DOWNWARD” bound car. Audible signal shall not sound when a car passes the floor without stopping.

2.29 HOISTWAY ACCESS SWITCHES: REUSE EXISTING

A. Reuse hoistway access switch(s) for elevator(s) at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. Switches shall be located 6ft. above the floor adjacent to the strike jamb side of the entrance frame. The exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate “UP”, “DOWN”, and “OFF” positions. Each access switch shall be a constant pressure cylinder type with key removable only when switch is in the “OFF” position. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose in the hospital. Arrange the hoistway switch to initiate and maintain movement of the car. When the car is moved from the top terminal landing, limit the zone of travel to a distance of approximately (10 feet) down travel.

2.30 HOISTWAY ENTRANCES FOR ELEVATORS: REUSE

A. Refinish existing entrance frames.

B. Provide new tracks, door hangers, rollers, door gibs, closer units, door pick up and release rollers, arms, beaks and door linkage.

C. Provide new stainless steel hoistway doors on elevators entrances. Door panels shall not be less than 16 gauge sheet steel. Reinforce each door panel for hangers, interlock mechanism and closers. Doors shall meet A17.1 Elevator Code. One door panel for each entrance shall bear a BOCA label or underwriter’s fire rated label. Fasten sight guard, extending full height of panel, to leading edge on side opening door.

D. Reuse existing Braille plates on both sides of door jambs, 5 feet to ctr. above landing sills.

2.31 ELECTRIC INTERLOCKS: NEW

A. Equip each hoistway door with true interlock functioning as hoistway unit system, to prevent operation of car until all hoistway doors are locked in closed position as defined by ASME A17.1. Interlock shall prevent opening of hoistway door from corridor side, unless car is at rest at landing, is operating in leveling zone at landing, or hoistway access switch is used.

B. Hoistway door interlock shall not be accepted, unless is has successfully met requirements of Section 2.12 of ASME A17.1. Securely fasten approved devices to the car and arrange to operate the interlocks without objectionable noise, shock or jar.

C. Equip car doors with electric contact which prevents operation of car until doors are closed as defined in ASME A17.1 unless car is operating in leveling zone or hoistway access switch is used. Locate door contact to prevent its being tampered with from inside of car. Car door contact shall not be accepted, unless it has successfully met requirements of Rule 2.14.4.2 of ASME A17.1.

D. Wiring installed from the hoistway riser to each door interlock shall be NEC type (SF-2), or equivalent.

2.32 ELECTRIC POWER DOOR OPERATORS: NEW

A. Provide a closed loop high performance door operator to automatically open the car and hoistway doors simultaneously after the car is level and automatically close the doors simultaneously at the expiration of the door open timing. The motor shall be of the high internal resistance type, capable of withstanding high currents resulting from stall without damage to the motor. The door operator shall be capable of opening a car door and hoistway door simultaneously, at a maximum speed of not less than two feet per second.

The closing speed of the doors shall be one foot per second. A reversal of direction of the doors from the closing to opening operation, whether initiated by the infrared curtain unit device or the door “OPEN” button, shall be accomplished within no more than 1-1/2 inches maximum of door movement. Particular emphasis is to be placed on obtaining quiet interlock and door operation, and smooth, fast, dynamic braking for door reversals and stopping of the doors reversals, and stopping the door extremes of travel. Construct all levers, operating the doors, of heavy steel members, and all pivot points shall have ball or roller bearings. Use electric power to open and close the doors.

B. Design the door operator so that in case of interruption of failure of the electric power from any cause, it shall permit emergency manual operation of both the car door and the hoistway door from the within the car, at door zone only, outside of door zone, doors are restricted to four inch opening.

1. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone.

C. Provide new PANA 40 PLUS infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully open position should the unit be actuated while the doors are closing. Unit shall function at all times when the doors are not closed, irrespective of all other operating features.

D. Should the doors be prevented from closing for more than predetermined adjustable interval of 20 to 45 seconds by the interruption of failure of the photo-electric curtain unit, door control shall activate door nudging operation, the doors shall close at reduced speed and the nudging buzzer located on the car shall sound. The doors will close in nudging.

E. If an obstruction in the sill should not activate the photo-electric curtain unit door control device and prevent the doors from closing for more than a predetermined adjustable interval of 45 to 90 seconds, the doors shall reverse to the fully open position and re-establish the closing cycle.

F. Provide new Stainless Steel car doors and door clutch assembly with door restrictor.

2.33 CAR SLINGS

A. Reuse existing car slings.

2.34 CAR PLATFORMS: REUSE EXISTING

A. Install new floor covering. Type and color shall be chosen by COTR.

2.35 CAR ENCLOSURES FOR ELEVATORS: INSTALL NEW INTERIOR WALL COVERING

A. Reuse existing cabs. Refinish all existing stainless steel cab panels. Remove existing laminated panels. Install new side and rear wall panels from 48 inches above finished floor to the ceiling. They shall be covered with new plastic laminate. Apply the plastic laminate to a minimum ½ inch fire rated particle board that meets ASME and Federal requirements. Submit a method of fastening particle board to steel. The particle board shall be one piece on back and side walls. COTR shall choose the color and type of stainless steel and laminate panels.

B. Bolt side exit doors shut. Remove safety switches and cover over doors with new cab interior panels, ASME A17.1 Section 2.14.1.10.

C. Install new electrical switch on emergency exit.

D. Reuse existing handrails at 30” and 42” to ctr. above finished floor.

E. Repaint dome bright white. Install new drop ceiling egg create type panels in existing frame, panel and color to be selected by COTR. Add “T” frame to the middle of each section of drop ceiling.

F. Install new cab ceiling lights. Install 4 sets of T-8 fluorescent light tubs 4 feet long with new ballasts.

G. Provide new fan blower unit.

H. Provide a stainless steel capacity plate on the front return panel or engraved in the panel.

I. Install new GFI electrical receptacle located in front return panel below main car operating panel.

J. Provide elevators with new stainless steel cab doors. Construct door panels to be flush hollow metal construction, not less than one inch thick, consisting of not less than one piece continuous 16 gauge stainless steel on car face side and leading and trailing edges. Separate by two plates of sound deadening material and reinforced by steel shapes welded to the plates at frequent intervals. Reinforce panels as required for installation of hangers, power operating and door operating devices. Hang door on two point suspension hangers having ball bearing sheaves not less than three inches in diameter with rubber or non-metallic sound reducing tires. Equip hanger with adjustable ball rearing rollers to take up thrust of panels. Up thrust roller shall be capable of being locked in position after adjustments to a maximum of 0.015 inch clearance. Provide two non-metallic door gibs on each door panel. Gibs shall be replaceable without removable of door panel.

H. Cover or fill-in all unused holes in the cab ceiling, front panels, walls and floor.

2.36 AUTO DIAL SYSTEM: NEW

A. Remove existing phone or intercom system located in the cab.

B. Auto dial system shall be provided for each elevator to replace existing phone system. Each auto dial shall have a separate number. Locate auto dial system in auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless steel cover plate. The words “Telephone, Push to Talk” shall be engraved in ¼ inch letters. When activated by the “PUSH TO TALK” button, the auto dial system shall automatically dial a number that is monitored 24 hours a day.

PART 3 - EXECUTION

3.1 SPACE CONDITIONS

A. The elevator machine room shall comply with Sections 3.7 and 2.7 of the ASME A17.1 Code 2005 edition.

B. Attention is called to existing overhead clearance, pit clearances, overall spaces available in hoistway and machine room environmental conditions in connection with completion of specified elevator work. Provide proper, satisfactory and code legal installation of equipment as a whole, including all construction, accessories, and devices in connection with elevator, mechanical and electrical work specified herein.

C. Any construction changes or relocation of equipment, conduit, wiring, etc., required to accomplish the specified elevator installation must be arranged for and obtained by the contractor, subject to the approval of the COTR. Cost of such changes shall be included in the base bid and shall form a part of the contract.

3.2 ARRANGEMENT OF EQUIPMENT

A. Clearance around new elevator, mechanical and electrical equipment shall comply with applicable provisions of NEC. Arrange new equipment so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same area.

3.3 WORKMANSHIP AND PROTECTION

A. All installations shall be made in a first class, neat and skillful manner by mechanics experienced in the trade involved. All details of the installation shall be mechanically and electrically correct. All materials and equipment shall be new and without imperfections.

B. Recesses, cutouts, slots, holes, patching, grouting, refinishing and the like to accommodate installation of equipment shall be included in the contractor's work. All new holes in concrete shall be core drilled.

C. No structural members shall be cut or altered. Work in place which is damaged or defaced shall be restored equal to original condition.

D. Finished work shall be straight, level and plumb, with true, sharp surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.

E. Where beams, slabs, or other building construction protrude more than two inches into the hoistway, all top surfaces shall be leveled with 20 gauge steel at an angle of at least 75 degrees to the horizontal.

F. If needed, protective enclosures shall be provided around hoistway openings during construction. Enclosure shall remain secured at all times.

G. Contractor shall provide and maintain approved fire extinguishers on site and in the areas where welding or cutting is to occur.

3.4 CLEANING

A. Prior to final acceptance, remove protection from finished or ornamental surfaces, and clean and polish surfaces with due respect to type of material.

3.5 PRETESTS AND TESTS

A. Pretest, as per specifications, the elevators and related equipment, in the presence of the COTR for proper operation before requesting final inspection.

B. Procedure outlined in the Inspection of Elevators, Escalators and Moving Walks (Inspectors Manual ASME A17.2) shall apply.

1. Final test shall be conducted in the presence of and witnessed by the Veterans Administration Consulting Support Service, (00CFM3A) Elevator Engineer.

2. Government shall furnish electric power including necessary current for starting, testing and operating machinery of each elevator.

C. If required by the Veterans Administration elevator engineer, inspection shall be conducted at other than normal working hours.

1. Contractor shall furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked testing weights, voltmeter, center reading ammeter, thermometers, stopwatch, direct reading tachometer and a series of "walkie -talkies" and oil pressure gauges.

2. If during the inspection process, the Veterans Administration representative determines the need, the following instruments should be available within a four-hour period: megohm meter, vibration meter, sound meter and a light meter.

D. Inspection shall be made of workmanship and equipment furnished and installed for compliance with specification.

E. Full Load Run Test: Elevators shall be tested for a period of one hour continuous run with full contract load in the car during the test run, the car shall be stopped at all floors in both directions of travel for a standing period of not less than five nor more than 10 seconds per floor.

F. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with empty load, 50% load, and full load run test. The actual measured speed of the elevator with all loads in either direction shall be within 10 percent for hydraulic elevators.

1. Full speed runs shall be quiet and free from vibration and sway.

G. The amp readings of the car in the up direction at full load shall not exceed the amp reading on the elevator motor data plate.

H. Temperature Rise Test: The temperature rise of the motor shall be determined during the full load test run. Temperatures shall be measured by the use of the thermometers. Under these conditions, the temperature rise of the equipment shall not exceed 40 degrees Centigrade above ambient temperature. Test shall be started only when parts of equipment are within five degrees Centigrade of the ambient temperature at time of starting test. Other tests for heat runs on motors shall be as specified in the latest procedure of the Institute of Electrical and Electronic Engineers.

I. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car, 50% load in car and with contract load in car, in both directions of travel. Accuracy of floor leveling shall be within plus or minus 1/8 inch of level with any landing floor for which the stop has been initiated (with a definite range of distance in advance of the landing) regardless of load in car or direction. The car leveling device shall automatically correct over travel and shall maintain the car floor within plus or minus 1/8 inch or level with the landing floor regardless of change in load.

J. Insulation Resistance Test; The elevator’s complete wiring system shall be free from short circuits and grounds and the insulation resistance of the system shall be determined by use of megohmmeter, at the discretion of the Veterans administration representative conducting the test.

K. Overload devices: Test all overload current protection devices in the system at final inspection.

L. Operating and signal systems. Operate the car by the operating devices provided. The operation signals and automatic floor leveling shall function in accordance with the requirements specified. Starting, stopping and leveling shall be smooth and comfortable, without bumps or jars.

M. Working pressure. Verify working pressure of the hydraulic system by pressure gauges placed in the system line. Take readings in the machine room with no load, 50% load, and full load in car.

N. Test automatic shutoff valve for proper operation.

O. Evidence of malfunction in any tested system or parts of equipment or component part thereof that occurs during, or as a result of, the tests, shall be corrected, repaired, or replaced at no additional cost to the Government, and the test repeated.

P. If equipment fails, test requirements and re-inspection is required. The Contractor shall be responsible for costs of re-inspection, including salaries, transportation expenses and other expenses of the representatives of the COTR.

Q. Limit Stops:

1. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at contract speed for both tests. Normal limit stopping devices shall be inoperative for the tests.

R. Setting of Car Door Contacts; the position of the car door at which the elevator may be started shall be measured. The distance from full closure shall not exceed that required by the code. The test shall be made with the hoistway doors closed or the hoistway door contact inoperative

S. Setting of interlocks: The position of the hoistway door at which the elevator may be started shall be measured and shall not exceed the Code Requirements.

3.6 PAINTING AND FINISHING

A. Upon completion of installation and prior to final inspection, all equipment shall be thoroughly cleansed of grease, oil, cement, plaster and other debris.

B. Elevator pump units, controllers, main line shunt trip disconnect switches, inside of hoistway doors, and cross heads of cars shall be identified by 4-inch high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be stenciled.

C. Surfaces of door frames, door panels, interior cab surfaces, etc., that become damaged or marred from any cause during construction shall be restored to original condition in a satisfactory manner before final acceptance of work.

3.7 INSTRUCTION OF PERSONNEL

A. Provide competent instructors to train qualified VA personnel in operation of the equipment and accessories installed under this contract, for a period of not less than eight hours. Instruction shall commence after completion of all work and at the date and time chosen by the COTR.

B. In addition to oral instruction, written instructions in triplicate relative to care, adjustment and operation of all equipment and accessories shall be furnished and delivered to the COTR in independently bound folders. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electric apparatus including location of each device, complete replacement parts lists with descriptive literature and identification and diagrammatic cuts of equipment and parts. Information shall also include electrical operation characteristics of all circuits, fields, relays, timers, regulators and electronic devices.

C. Provide any supplementary instruction for adjustment and care of new equipment that may become necessary because of changes, modifications and/or replacement of equipment of operation under requirements of paragraph entitled “GUARANTEE.”

3.8 INSPECTIONS AND MAINTENANCE

A. Furnish all material and labor for complete maintenance and inspection service on elevator installation for a period of (1) one year after completion and acceptance of the complete elevator installation by the COTR. This maintenance service period shall begin with the acceptance of the last elevator and shall run concurrently with the guarantee. Maintenance work shall be performed by skilled elevator personnel directly employed and supervised by the same company that furnished and installed the elevator equipment specified herein. The elevator contractor shall provide maintenance on the elevators listed in the specifications when the project has been awarded.

B. The maintenance service shall include the following:

1. Bi-weekly systematic examination of the hydraulic equipment as per manufacturer’s recommendations.

2. Cleaning, lubricating, adjusting, repairing and replacing of all parts as necessary to keep the equipment in working order.

3. Furnishing all lubricant, cleaning materials and parts required.

4. The performance standards set forth in this specification, including flight time, cycle time, and door times shall be maintained at all times.

5. The operational system shall be maintained to the standards specified hereinafter including any changes or adjustments required to meet varying conditions of hospital occupancy.

6. Maintain smooth starting and stopping and accurate leveling at all times.

C. Maintenance service shall not include the performance of any work required as a result of improper use, accidents, or negligence for which the contractor is not directly responsible.

D. Provide 24 hour emergency call-back service which shall consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency trouble develop between regular examinations and one hour for “trap calls”.

E. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of the equipment and persons in and about the elevator.

F. Service and emergency personnel shall report to the authorized representative upon arrival at the hospital and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed shall be given to the authorized representative.

G. The contractor shall maintain a log in the machine room. The log shall list the date and time of all bi-weekly examinations and trouble calls. Each trouble call shall be fully described including the nature of the call, necessary correction performed or parts replaced.

H. After signing contract, the elevator contractor shall maintain all elevators listed in this contract during the project renovation period. This is separate from the one year maintenance contract which starts with the completion of the acceptance of final elevator in this elevator project.

- - - END - - -

VAMC KERRVILLE, TX

PROJECT #671A4-07-111ES

BUILDING #11 ELEVATORS P3 & P4

SECTION 14226 A

MODERNIZATION OF EXISTING HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section of the specification is intended to cover the complete furnishing of all labor, materials, engineering, tools and equipment required to furnish specified alterations and new components on hydraulic elevators, Building #11, Elevators P3 and P4 (duplex elevators).

1.2 ELEVATOR SERVICE

A. A maximum of one elevator may be removed from service at one time, unless prior arrangement is made with VA Contracting Officer's Technical Representative (COTR) to permit performance of work. All work on elevator vacated shall be completed, put into satisfactory operation, and accepted before work on next elevator is started. Prior to final acceptance, contractors shall complete all pertinent safety tests and inspections. Final inspection and tests shall be given only when all work on all elevators has been completed. Final contract acceptance shall be given only upon successful completion of final inspections and tests.

Premises shall be occupied during performance of work, but elevator contractor shall have uninterrupted use of scheduled elevator vacated for completion of work.

1.3 WORK SCHEDULE

A. Before work is started, submit prepared work schedule for approval and arrange with COTR sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways and elevators, location of temporary partitions, etc. The COTR must be notified fourteen (14) calendar days, in writing, in advance of starting work on elevators. No work may be begun on any elevator until all materials for that elevator have been delivered to the site and verified by the COTR. First elevator to be removed from service shall be designated by COTR.

1.4 SAFETY PRECAUTIONS

A. Building will be occupied during execution of work. Work shall be conducted in a manner to afford maximum protection of building, facilities, patients, employees and the public; and to prevent unreasonable delay or interference with normal functioning of hospital activities.

B. Provide fire extinguishers so that they shall be readily available at all times.

C. It shall be the obligation of the elevator contractor to maintain a free and clear passageway in each elevator lobby. Parts, tools, etc., shall be kept within the confines of entrance partitions and trash will be removed daily.

D. Provide flame retardant 5/8 inch drywall partition when contractor is chopping the walls or core drilling. Barrier shall extend to full height of the elevator lobby.

1.5 REMOVED MATERIALS AND EQUIPMENT

A. Materials that are required to be removed and not specified to be reused or retained under contract shall be removed from the site at the expense of the elevator contractor. Elevator contractor shall receive title to all materials and equipment required to be removed and not specified to be reused or retained, as of date of withdrawal of material from service by elevator contractor to complete required and scheduled work. Government does not warrant condition of said material to which elevator contractor shall obtain title, nor shall Government be liable for damage before or after title passes to elevator contractor.

1.6 APPLICABLE PUBLICATIONS

A. The following specifications and standards of the issues below (including the amendments, addenda, and errata designated) form a part of this specification to the extent indicated by the reference thereto. In text, such specification and standards are referred to by basic number or designation only.

1. Federal Specifications (Fed. Spec.):

J-C-580B(1) Cord; Flexible and Wire, Fixture(Electrical-600 volt service_

W-C-596A(2) Connector, Plug, Electrical; Connector Receptacle, Electrical

W-F-406E Fitting for Cable, Power, Electrical and Conduit, Metal, Flexible

W-S-610(1)Splice, Conductor

ABS/UL 797 Conduit, Metal, Rigid; Electrical, Thin Wall Type(electrical metallic tubing); Straight Lengths, Elbows and Bends

WW-C-566C Conduit, Metal, Rigid; Coupling, Elbow and Nipple; Electrical Conduit- Zinc Coated

GAUGES: Sheet and Plate- U.S. Standard Wire: American Wire Gauge(AWG)

2. D1.1-92: American Welding Society (AWS)

3. IEEE: Institute of Electrical and Electronic Engineers.

4. NEMA: National Electrical Manufacturers Association

5. NFPA No. 252: Fire Tests of Door Assemblies

B. The following standards and codes of the issued listed below (including the latest amendments, addenda, and errata) form a part of this specification:

1. A17.1: 2007 American National Standards Institute (ANSI/ASME) Standards: Safety Code for Elevators and Escalators. In text, publication will be referred to as the Code.

2. A17.2: 2004 American National Standards Institute (ANSI) Standards: Practice for the Inspection of Elevators, Escalators and Moving Walks, Inspector's Manual.

3. NFPA No. 70: (Latest version) National Electrical Code. In text, the Code will be referred to as NEC.

4. Uniform Federal Accessibility Standards & VA Supplement to uniform Federal Accessibility Standards, 1988.

5. Americans with Disabilities Act, Latest edition with supplements.

6. NFPA 2009 Life Safety Code.

1.7 QUALIFICATIONS

A. Approval by the COTR is required of products or services of proposed manufacturer, suppliers and installers and will be contingent upon submission by the contractor of a certificate stating the following:

1. Manufacturer is currently and regularly engaged in modernization of elevator equipment as one of his principal products.

2. Installer has technical qualifications of at least five years of successful experience, trained supervisory and installation personnel, and facilities to install and/or modernize elevator equipment specified herein.

3. Proposed contractor shall submit a list of two or more prior hospital installations where all the elevator equipment he proposes to furnish on this project has performed satisfactorily together under conditions of normal use. The list shall include projects that have been in operation for a period of not less than two years preceding the date of these specifications, and will include the names and addresses of the medical center, and the names of the medical center administrators.

B. Approval of the contractor’s equipment will be contingent upon his having a permanent and satisfactory local maintenance service branch which shall render services within two hours of receipt of notification. Contractor shall submit the names and addresses of his authorized branch or service department which will render service to this installation, together with certification that the quantity and quality of replacement parts stock on hand is sufficient to guarantee continued operation of the elevator installation.

C. Elevator equipment shall not exceed a noise rating of 80 dB.

1.8 WIRING DIAGRAMS

A. Provide three complete sets of field wiring and straight line wiring diagrams showing all electrical circuits in the hoistway and in the machine room. One set framed under glass or on pivoted hard boards coated with an approved plastic sealer shall be mounted in elevator machine room as directed by COTR. In the event field modifications are found necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection. Corrected diagrams shall be delivered to the COTR within 30 days of final acceptance.

B. The following information relating to the specific type of microprocessor controls installed on this project shall be provided: (3 sets)

1. Owner’s information manual, containing general data on major components maintenance and adjustment.

2. System logic description.

3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and/or replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.

4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

1.9 ADDITIONAL EQUIPMENT

A. Additional equipment required to operate specified equipment manufactured shall be furnished and installed. The cost of such equipment shall be included in the base bid.

1.10 SAMPLES AND DESCRIPTIVE DATA

A. Materials shall be submitted singularly and separately and apart from materials specified under other Sections and shall be marked “SUBMITTED UNDER SECTION 14226,” in accordance with provisions of SECTION 01340, SAMPLES AND SHOP DRAWINGS. All submitted drawings and related elevator material shall be forwarded to South Texas Veterans Health Care System, Facilities Management room #138, 7400 Merton Minter Blvd., San Antonio, TX 78229, to the attention of Jeff Moore in order to perform a concurrent review.

B. Before executing any work, furnish information sufficient to evidence full compliance with contract requirements on proposed items. Such information shall include, as required, manufacturer’s name, trade names, model of catalog number, nameplate data (size, capacity, rating) and corresponding specification reference (federal or project specification number and paragraph).

C. Name of manufacturer, type or style designation and applicable data of the following equipment shall be shown on the elevator layouts:

Controller

1. Electric door operator; hp rating and rpm of motor.
2. Car operating panels.
3. Cab laminate.
4. Cab floor tile.
5. Hydraulic electric control valves.
6. Stainless steel hoistway and car doors.
7. Infrared curtain units.

Shop drawings:

1. Tank unit and pump motor.
2. Cuts or drawings of power door operator.
3. Hoistway door tracks, rollers, interlocks, pick up and release rollers.
4. Main and auxiliary car operating panels.
5. Hall position indicators and hall push buttons.
6. Furnish certificates as required under paragraph “Qualifications”.

1.11 PERFORMANCE STANDARDS

A. The elevators shall be capable of meeting the highest standards of the industry and specifically the following:

1. Contract speed shall mean speed in the UP and DOWN direction with empty, 50% and full capacity load in the car. Speed variation under any load condition, regardless of direction, shall be no more than 10 percent for hydraulic elevators.

2. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration. Stopping shall be without bumps or vibrations.

3. Full speed running shall be quiet and free from vibration and swaying. When cars are standing at the floor with doors open, they shall remain firmly stopped and shall not rock side to side.

4. Cars shall not move from side to side during the process of opening and closing the doors.

1.12 TOLERANCES

A. Floor Accuracy: Leveling control system, 1/8 inch above or below the floor.

1.13 GUARANTEE

A. The modernized elevator system shall be guaranteed for a period beginning with the completion and acceptance of the last traction and hydraulic elevator installation by the COTR. It shall be subject to terms of “GUARANTEE” articles of SECTION GENERAL CONDITIONS (except for length of guarantee). Upon receipt of notice from the Government of failure of any portion of materials and workmanship furnished, affected part or parts shall be replaced promptly with new parts by and at the expense of the contractor. No reused components shall be permitted. The guarantee period shall concur with the length of the maintenance contract.

B. If it becomes evident during the guarantee period that any device in not functioning properly or in accordance with specification requirements, or in the opinion of the COTR, excessive maintenance and attention must be employed to keep device operating, device shall be installed as part of work until satisfactory operation of installation is obtained. Period of guarantee shall start new from date of completion of new installation performed in accordance with foregoing requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Where stainless steel is specified, it shall be corrosion resisting steel complying with Fed. Spec. QQ-S-766, Class 302 or 304, condition A with Number 4 finish (150 grit) on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and all surfaces shall be perfectly smooth and without waves.

2.2 MANUFACTURED PRODUCTS

A. Materials, devices and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. Items not meeting this requirement, but which otherwise meet technical specifications and the merits of which can be established through reliable test reports or physical examination of representative samples, will be considered.

B. When two or more units of same class of materials, devices, or equipment are required, these units shall be products of one manufacturer.

C. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit.

1. All components of an assembled unit shall be products of the same manufacturer.

2. Parts which are alike shall be the product of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for the intended service.

D. If the elevator equipment to be installed is not known to the COTR, the contractor shall submit drawings in triplicate (three prints), for approval, showing all details or demonstrate to the satisfaction of the COTR that the equipment to be installed is in strict accordance to the specifications.

E. Welding at the project site shall be made by welder and welding operators who have previously qualified by test and prescribed in American Welding Society Publication AWS D1.1 to perform type of work required. A VA permit is necessary when welding or burning.

F. Motor nameplates shall state rated horsepower, speed, volts, amperes and other characteristics required by NEMA Standards and shall be securely attached to the item of equipment in a conspicuous location.

G. The elevator equipment, including controllers, door operators, relay panels, and supervisory system, shall be the product of one manufacturer of established reputation, except that any of the above items may be the product, either wholly or in part, of any manufacturer of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure a first class, safe and smooth operating system.

H. Where key operated switches are furnished in conjunction with any component of this elevator installation, furnish four (4) keys for each individual switch or lock. “Barrel type” keys shall not be used. Attach each key to a tag bearing a stamped or etched legend identifying its purpose.

I. Rated speed shall mean speed in either direction of travel with rated capacity load in car. Actual speed, under any load condition shall not vary more than 10 percent for hydraulic elevators.

2.3 SCOPE OF WORK

A. Scope of work to include renovation of the following hydraulic elevators.

B. Building #11, Elevators P3 and P4 (duplex). Rated load 3000 lbs, Speed 125 fpm, 35 feet 6.75 inches of travel.

1. New tanks, motors, pumps and control valves.
2. New controllers.
3. New shunt trip breakers.
4. Install smoke detectors at the top of hoistways, elevator lobbies and elevator pits.
5. Install new oil lines and fittings in Machine Room.
6. May reuse existing machine room duct.
7. Add sprinklers and heat detectors to elevator pits.
8. Provide all wiring for Phase I fire recall operation.
9. Reuse existing fascia and dust covers. Replace missing or damaged dust covers as needed.
10. Refinish stainless steel entrance frames.
11. New stainless steel doors, door tracks, door hangers, rollers and gibs.
12. New pickup and release roller assemblies.
13. New interlocks and lock-hawk assemblies.
14. May reuse existing hoistway duct.
15. New terminal limit switches top and bottom.
16. New traveling cables.
17. New hoistway wiring.
18. Remove existing Hall Lanterns.
19. New L.E.D. type Hall Push Button Fixtures.
20. Combination Position Indicator fixture at all floors.
21. New Fire Service (Phase I) key switch at 1st floor.
22. Reuse access key switches at top and bottom floors.

23. Remove existing car position indicator from car transom. Cover hole with stainless steel plate.

24. New Main and Auxiliary Car Operating Panels.

25. New digital car position indicator in main car operating panel.

26. New Emergency Light in main car panel.

27. New Capacity Plate.

28. Install new GFI outlet in cab.

29. New cab floor tile.

30. Reuse existing hand rails (Stainless Steel handrails 30’ and 42” to center above floor).

31. Remove cove light fixtures.

32. Paint ceiling of cab bright white.

33. Install new drop ceiling with new ceiling panels.

34. Install new cab lighting.

35. Reuse lower cab walls (from floor to 48” above floor). Install Laminate above to ceiling.

36. Install new Stainless Steel car doors.

37. New hands free phone in auxiliary car panel. Remove existing phone.

38. New Door operator, door equipment and door clutch.

39. New “PANA- 40 PLUS” (infrared curtain).

40. New Cartop Control Station, light and fan.

41. New emergency exit switches.

42. New Leveling unit.

43. New Light and GFI outlet on bottom of car.

44. New roller guides for top and bottom of car.

45. Reuse car sling.

46. Reuse buffers.

47. Install new automatic and manual shut off valves in pit.

48. New scavenger pumps.

50. New GFI outlets and Light Switches in pit(switch at top of ladders).

51. New Jack Packing(s).

52. New pit stop switches 48” above pit floor adjacent to pit ladder and 48” above pit floor.

2.4 POWER SUPPLY

Reuse existing power.

2.5 AUXILIARY POWER OPERATION: OPTION A or B

A. The control system for elevators P3 and P4 shall include provisions for operation on auxiliary power upon failure of the normal power supply.

The electrical contractor provides auxiliary power supply, including its starting means, transfer switch for transfer of elevator supply from normal to auxiliary power, a pair of conductors in a conduit from an auxiliary contact on the transfer switch (contact closed on normal power - open on auxiliary

power) to terminals on the elevator controller and other related work. If auxiliary power is not sufficient capacity to run all elevators, provide a timing relay from normal power to auxiliary power and another relay for delay back to normal power.

The elevator contractor shall provide equipment on elevator controllers and wiring between associated elevator controllers required to permit the elevators to operate as a group or one at a time.

B. Provide a “rescuvator” (battery pack) type system to lower the elevator to the lowest floor. Provide a power source to send the elevator to the lowest landing by activating the down valve. After the elevator has leveled at the lowest landing, provide power to open the car doors automatically. After a predetermined time the car doors shall close. Power shall be applied to the door open button so that doors can be opened from inside the elevator only. The elevator shall remain shut down at the bottom landing until normal power is restored. Install a sign on the controller indicating that power is applied to the down valve and door operator during loss of normal power.

2.6 GROUNDING

A. Equipment grounding shall be provided. Ground conductors supports, controller enclosure, motors, platform and car frames and other non-current conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, insulated and sized as required by NEC. Bond the grounding wires to each of the pull boxes, junction boxes, cabinets and other enclosures through which the wires pass.

2.7 CONDUIT, ETC.

A. Existing conduit that conforms to NEC may be reused. New conduit shall comply with the following paragraphs:

B. Unless otherwise specified or approved, all electrical conductors, except traveling cable connections to the car, shall be installed in rigid zinc-coated steel, electrical metallic tubing or metal wireways. All raceways completely embedded in concrete slabs or floor fill, shall be rigid steel conduit. Wireways and auxiliary gutters shall be in accordance with the applicable requirements of NEC and may be used between controller, starter and similar apparatus in the elevator machine room. Flexible metal conduit not less than 3/8 inch electrical trade size may be used, not exceeding 18 inches in length, for short connections between risers and limit switches, interlocks and for other applications permitted by NEC. Self supporting connections, where approved, shall be fully protected from abrasion or other mechanical injury. Flexible heavy-duty service cord, type S.O., may be used between fixed car wiring and switches on car doors for curtain units.

C. All conduit and EMT terminating in steel cabinets, junction-boxes, wireways, switch boxes, outlet boxes and similar location shall have approved insulating bushings. If the bushings are constructed completely of insulating materials, a steel lock nut shall be installed under the bushing. At ends of conduits not terminating in steel cabinets or boxes, the conductors shall be protected by terminal fittings having an insulated opening for the conductors.

1. All openings in metal wireways shall be smooth and shall be insulated.

D. Conduit and EMT fittings and connectors using set screws or indentations as a means of attachment shall not be used.

E. Connect motors or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits. Certain existing conduits and ducts may be reused if they are code conforming and prior agreement is received from the VA COTR.

2.8 CONDUCTOR: NEW

A. Unless otherwise specified, conductors, exclusive of traveling cables, shall be stranded or solid coated annealed copper in accordance with Federal Spec. J-C-30 for either Type RHW or TRW. Where 16 and 18 AWG are permitted by NEC, either single conductor cable in accordance with Federal Spec. J-C-580 for Type TF or multi-conductor cable may be used, provided the insulation of single conductor cable may be, and outer jacket of multi-conductor cable is flame retardant and moisture resistant. Multi-conductor cable shall have color coding or other suitable identification for each conductor. Conductors for control board wiring, including wiring between main circuit resistors and control board wiring, shall be in accordance with NEC. No joints or splices will be permitted in wiring, except as outlets. Tap connectors may be used in wireways provided they meet all UL requirements.

B. All wiring must be test free from short circuits or grounds. Insulation resistance between individual external conductors and between conductors and ground shall be not less than one megohm.

C. Where size of conductors is not given, capacity shall be such that maximum current shall not exceed limits prescribed by NEC.

D. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors in accordance with Federal Spec. W-S-610. The contractor may at his option make these terminal connections on No. 10 or small conductors with approved terminal eyelets set on the conductor with a special setting tool or with an approved pressure type terminal block. Terminal blocks using pierce through serrated washers are not acceptable.

E. Install new wiring from shunt trip circuit breaker to new controller.

2.9 TRAVELING CABLES: NEW

A. All conductors to the car shall consist of flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on top of the car directly to controller. Junction boxes shall be equipped with terminal blocks. Terminal blocks having pressure wire connectors of the clamp type that meet UL 486 requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks shall have permanent indelible identifying numbers for each connection. Cables shall be securely anchored to avoid strain on individual terminal connections. Outer covering must remain intact between junction boxes. Abrupt bending, twisting and/or distortion of the cables shall not be permitted.

B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than 4 spare conducts in each traveling cable.

C. Provide shielded traveling cable wire for the auto dial system within the traveling cable.

D. If needed, provide a twenty-four-inch wire hardware cloth shall be installed from each hoistway junction box downward to the elevator pit to prevent traveling cable from rubbing or chafing. Hardware cloth shall be securely fastened and tensioned to prevent buckling. Hardware cloth is not required when traveling cable is hung against a flush wall.

2.10 HYDRAULIC CONTROLLERS: MICROPROCESSOR CONTROL SYSTEM

A. The elevator contractor shall provide solid state components and printed circuit boards to control the hydraulic machine or signal functions. Provide complete details of the components and printed circuit boards, together with a complete operational description, shall be submitted for approval prior to manufacture. The controller shall be nonproprietary and no special tool, including a hand held testing tool shall be necessary for adjustments or

maintenance. The controller vendor shall be able to provide immediate tech support and be able to overnight mail any parts necessary for maintenance.

B. The controllers shall meet ASME A17.1.

2.11 PUMP UNIT ASSEMBLY - TANK, MOTOR, PUMP, CONTROL VALVE, ETC.

A. Completely integrate the pump unit for the control of the elevator. The unit shall consist of a hydraulic fluid pump driven by an induction motor together with oil control valves, piping, etc. Do not install hydraulic equipment within the storage tank. No submersible pump. Completely enclose unit on four open sides of the power unit frame with not less than 16 gauge steel removable panel sections. Fully line each panel on the interior side with one inch rigid board or equivalent acoustical insulation.

B. Design hydraulic system so that working pressure does not exceed 500 psi under any loading condition.

C. Pump output shall be capable of lifting elevator with rated capacity load, with a speed variation of no more than 10% between no load and full load.

D. Motor shall be squirrel cage, drip proof, ball bearing, induction type, with a synchronous speed not in excess of 1800 rpm. Design motor specifically for elevator service, not to exceed nameplate full load current by more than 10% and be continuously rated at 120 starts per hour without exceeding a raise of 40 degrees C.

E. Provide reduced voltage starter with solid state controls.

F. Connect motor and pump with multiple V-belt. Size belts and sheaves for duty involved and design to prevent any metallic contact between motor and pump shaft.

G. Reuse existing jacks and pistons. Provide new jack packing for hydraulic elevators.

2.12 HYDRAULIC SYSTEM

A. Hydraulic fluid shall be of good grade to assure free flow when cool, and have minimum flash point of 400 degrees.

1. Provide a data plate on the tank framing indicating the characteristics of the hydraulic fluid used. Install new oil lines between the storage tank, pump, muffler and operating valves. Replace all oil line in the machine room space. Do not subject valves, piping, and fittings to working pressure greater than those recommended by the manufacturer.

B. Control valves shall have solenoid operation and arrange so hydraulic fluid flow will be controlled in positive and gradual manner to insure smooth starting and stopping of elevator.

C. Install new automatic shut-off valve in the oil supply line at the cylinder inlet, activate the automatic shut-off valve when there is a ten percent drop in no-load operating pressure. When activated, this device shall immediately stop the descent of the elevator, and hold the elevator unit it is lowered to use of the manual lowering feature of the valve. Arrange the manual lowering feature of the automatic shut-off valve to limit the maximum descending speed of the elevator to 15 FPM. The exposed adjustments of the automatic shut-off valve shall have their means of adjustment sealed after being set to their correct position. When new, weld to threaded pipe located at the jack head, do not use Victaulic fittings at jack head.

D. Install new scavenger pumps. Scavenger pumps shall have a copper tubing scavenger line with an electrically operated pump between the piston drip ring and oil storage tank. Scavenger line, pump, and strainers shall operate independently of hydraulic fluid pressure. Scavenger pump shall have a water

float designed to prevent operation of the pump, should the pit flood and shall be manually reset. Strap the pump and reservoir to the pit.

E. Provide all pump relief and other auxiliary valves to comply with the requirements of the Code to insure smooth, safe, and satisfactory operation of elevator.

F. Furnish and adjust by-pass and relief valve in accordance with Rule 3.19.4 of ASME A17.1.

G. Manual shut-off valves shall have a handle attached to the valves.

H. Conveniently locate the manual lowering valve, easily accessible, and properly identified with a red arrow and not concealed within the storage tank. Mark the operating handle in red.

I. Provide a low oil control feature which shall shut off the motor and pump and return the elevator to the lowest landing. Upon reaching the lowest landing the doors will open automatically allowing passengers to leave the car. Then doors shall close. All control buttons, except the door open button, shall be made ineffective.

2.13 CAR GUIDE RAILS

A. Retain existing car guide rails and brackets.

B. Thoroughly clean all guide rails of grease, oil, rust and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car and counterweight.

2.14 GUIDES FOR CAR: NEW ROLLER GUIDES

A. Install new adjustable roller guides.

B. Each guide shall be of an approved type consisting of not less than three (3) wheels, each with a durable, resilient oil-resistant material tire rotating on ball bearings having sealed-in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. Secure the roller guides at top and bottom on each side of car frame and counterweight frame. All mounting bolts shall be fitted with nuts, flat washers, split lock washers and if required, beveled washers.

C. Minimum diameter of the car rollers shall not be less than 150 mm (6 inches).

D. Equip the car with an auxiliary guiding device for each guide shoe which shall prevent the car from leaving the rails in the event that the normal guides are fractured. These auxiliary guides shall not, during normal operation, touch the guiding surfaces of the rails.

2.15 CAR BUFFERS

Reuse existing.

2.16 NORMAL AND FINAL TERMINAL STOPPING DEVICES

A. Provide new normal and final stopping devices they shall conform to the elevator code ASME A17.1.

2.17 TOP-OF-THE-CAR OPERATING DEVICE: NEW

A. The device shall conform to ASME A17.1.

B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked “INSPECTION” and ‘NORMAL” on the faceplate, with ¼ inch letters.

C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and safety button.

D. Provide an emergency stop toggle switch as specified in ASME A17.1.

E. Provide permanent identification for the operation of all components in the device.

F. The device shall be permanently attached to the elevator crosshead on the side of the elevator which is nearest the elevator hoistway doors.

2.18 CAR LEVELING DEVICE

A. Install new Car Leveling device.

B. Car shall be equipped with a two-way leveling device to automatically bring the car to within 1/8 inch of exact level with the landing regardless of load in car or direction.

C. Car shall, at all times, level into the floor and shall not stop above or below the floor and level back.

D. The automatic leveling device shall, within its zone, be entirely independent of the operating device and if the car stops short or travels beyond the floor, the leveling device shall automatically correct this condition and maintain the car within plus or minus 1/8 inch of level with the floor landing regardless of the load carried.

E. A car leveling device functioning through the medium of vacuum tubes or photoelectric tubes is not acceptable. Approved permanent magnet or electromagnetic leveling device is required.

2.19 WORK LIGHTS AND OUTLETS

A. Provide GFI protected duplex 3-wire grounded type receptacles and lamp, with wire guards on top of elevator car and beneath platform.

B. The receptacles shall be in accordance with Fed. Spec. W-C-596/12D for Style D7, 2-pole, 3-wire grounded type rated for 15 amperes and 125 volts.

2.20 EMERGENCY STOP TOGGLE SWITCHES

A. Emergency stop toggle switches shall conform to ASME A17.1.

B. Each stop switch shall be red in color and shall have its “Identity” and ‘STOP” and ‘RUN” positions legibly and indelibly identified.

C. Provide new pit switches. Locate at 4ft. above pit floor and 4ft. above bottom landing sill at the top of the pit ladder. Switches shall meet ASME A17.1 code.

2.21 ELEVATOR CAR OPERATING PANELS: REMOVED EXISTING AND INSTALL NEW

A. New main car operating panels shall be located in the front wall panel of the car enclosure. It shall be positioned such that top passenger use device floor button shall be not more than 48 inches above the finished floor.

B. All terminology on main car operating panel and auxiliary panel shall be raised or engraved. Use 1/8-inch letters to identify all other devices in upper section of the main car operating panel. The handicapped marking contrasting background shall be recessed .030 inch in a square or rectangular shape, in the faceplate, with the finished face of the 1/2 inch high numeral and Braille markings flush with the finished faceplate. The numerals and markings shall be integrated with the faceplates. Applied plates are unacceptable. Engrave number of elevator, one inch high, in upper part of car panel.

C. Two-section flush panel shall have lower section recessed and fitted with hinged doors. Door of lower section shall have concealed hinges and shall be in same front plane as lower section and shall be fitted with cylinder type, key operated lock. Two-section panel shall have one piece faceplate.

1. The upper section shall contain:

a. A complete set of minimum one-inch diameter LED white light illuminated push buttons corresponding to the floors served. Lights shall extinguish when the car stops at a given floor. Each call button shall be legibly and indelibly identified by floor number not less than ½ inch high in the face of each call button.

b. Keyed emergency stop switch (red in color).

c. Emergency signal alarm bell button (red in color) conspicuously located to minimize accidental activation.

d. Two-position, key-operated INDEPENDENT SERVICE switch marked "INDEPENDENT SERVICE" with two positions marked "OFF" and "ON".

e. The three position, key-operated FIRE SERVICE switch marked "FIRE SERVICE" with three positions marked "OFF", "HOLD" and "ON". Adjacent to the FIRE SERVICE switch, provide a series of vertical lines engraved and filled with red translucent material or fire hat which shall illuminate when required on FIRE SERVICE operation.

f. Engrave fire service operation signage on car operating panel.

g. A buzzer for FIRE SERVICE operation.

h. Door "OPEN" and door "CLOSE" buttons located below the car buttons. The door "OPEN" button shall be located adjacent to the car door entrance column.

i. An emergency "PUSH TO TALK" button for auto dial system. Engrave "PUSH TO TALK" over button. Engraving shall be 1/4 inch.

j. Provide a "Door Hold" button on faceplate. It shall have "Door Hold" engraved on button. Button shall light when activated. When activated, the door shall stay open for a maximum of 1 minute. To over ride door hold timer, push car operating panel floor call button.

k. Provide an emergency car lighting system on each car, consisting of a rechargeable battery, charger, controls, and light fixture. The system shall automatically provide emergency light in the car upon failure or abnormal interruption of the normal car lighting service, and function irrespective of the position of the light control switch in the car. The system shall be capable of maintaining a minimum illumination of 1.0 foot-candle when measure 4 feet above the car floor, and approximately one foot in front of the car operating panel, for a period of not less than four hours. Emergency light shall be located in main car operating panel.

2. The lower section shall contain:

a. Toggle switch for controlling interior car lighting.

b. Three position toggle switch (high, low and off) for controlling car ventilating blower.

c. Two-position toggle inspection switch that will disconnect normal operation, activate hoistway access switches at terminal landings. Switch shall be marked "INSPECTION" with two-positions marked "ON" and "OFF".

d. Two position, spring return toggle switch or push button to test the emergency light and alarm bell. It shall be labeled "Test emergency light and bell".

2.22 INDEPENDENT SERVICE

A. Provide a two-position key operated "INDEPENDENT SERVICE" switch in the main car operating panel which shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls registered on its car dispatch buttons and shall bypass all calls registered on landing push buttons. Car and hoistway doors shall not close until a car

button or the “DOOR CLOSE” button is pressed and held until interlock circuits are made up.

2.23 CAR POSITION INDICATOR: NEW

A. When installing car position indicator in car operating panel in elevator, use L.E.D. digital read out type. L.E.D. position indicator shall show floor and have direction arrow. Arrow and number shall be a minimum of 2 inches high.

B. Provide a stainless steel cover plate to cover old existing car position indicator hole.

2.24 AUXILIARY CAR OPERATING PANEL: STRIKE JAMB SIDE OF CAB BETWEEN HANDRAILS.

A. The auxiliary car operating panel shall contain only those controls essential to passenger operation.

1. Mount red emergency signal alarm bell button, door “OPEN” and door “CLOSE” buttons in an easily identifiable group with stop switch and the alarm bell button mounted at a point no closer than 35-inches to the finished floor and nearest the door jamb.

2. Complete set of LED white light bulbs illuminated push buttons with a minimum diameter of 1-inch. Buttons shall have the floor designation indelibly marked on their face using 1/2-inch characters, corresponding to the numbers of the main car operating buttons. Provide buttons in a compact vertical grouping for center opening doors and a horizontal group for two-speed doors. Provide Braille identification on car operating panel.

3. Cross-Connect all buttons in the auxiliary car operating panels to their respective buttons in the main car operating panel. Registration of a car call in either panel shall cause the corresponding button to illuminate in both the main and auxiliary car operating panels.

4. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with non-corrosive white metal spanner head or Bristol head tamperproof screws.

5. Submit design of auxiliary car operating panel for approval.

6. Install auto dial phone system in auxiliary car operating panel on all elevators.

7. Install an “Emergency Push to Talk” button for auto dial system in auxiliary car operating panel. Engrave “PUSH TO TALK” over button, minimum of ¼ inch engraving.

2.25 DUPLEX SELECTIVE CAR SELECTIVE COLLECTIVE AUTOMATIC OPERATION; P3 & P4

A. Design system so that on operation of the dispatch button in the car is activated, the car shall start automatically, provided the hoistway door interlock and car door contact circuits have been established and shall stop at the first floor reached for which the call has been registered. Only one car shall respond to any one landing call and it shall be the car nearest to the call which is set to travel in corresponding direction of the registered call.

B. Arrange the system so that normally one car shall be parked at the main floor and the other car parked at the last landing served. Both cars shall park with their doors closed. The car parked at the main landing shall be considered the “parked” car and the other car shall be considered the “free” car. Should both cars complete their calls at the main landing, the car which arrives first shall be considered the free car.

C. If a car taken out of service for any reason, or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40

to 80 seconds, all calls shall be transferred to the other car which shall than function as a single car selective collective elevator until the “out of service” car is returned to service.

2.26 FIRE SERVICE

A. Provide Phase I Fire Service wiring and smoke detectors required by ASME A17.1.

B. Smoke Detectors

1. Provide smoke detection in each elevator lobby, machine room and at top of hoistway to activate Phase I fire service recall for elevators (P1 and P2). Furnish and install the smoke detection devices, together with all necessary conduits, wiring, relay, etc. required between the Fire Alarm System and the elevator machine room shall be furnished and installed under this section of the specification.

2. Upon activation of an elevator lobby, top of hoistway, and machine room smoke detection device, transmit a signal to the building fire alarm control console. Transmit an "Alarm" signal from the console to the elevators, which shall activate the "Fire Service" Phase I operation. The "Alarm" signal received from any elevator lobby, top of hoistway, or machine room smoke detection device, except that device located in the main lobby shall activate the same sequence of operation activated by the "Fire Service" key operated switch in the main lobby control panel. Together the "Alarm" signal received from the smoke detection device, located in the main landing lobby, shall activate the same sequence of operation activated by sending the elevator to the designated alternate floor.

3. First floor shall be main fire floor. Ground floor shall be alternate fire floor.

2.27 OPERATING DEVICE FACEPLATES: NEW

A. Fabricate faceplates for the elevator operating and signal devices from not less than 1/8 inch thick flat stainless steel with all edges beveled at least 15 degrees. Install all faceplates flush with surface upon which they are mounted.

B. Corridor push button faceplates shall cover existing push button plate area. The centerline of the landing push button fixtures shall be 42 inches above the corridor floor. Provide LED white light bulbs.

C. Fasten all car and corridor operating device and signal device faceplates with non-corrosive white metal spanner head or Bristol head tamperproof screws.

D. Design car and corridor push button face plates so that pressure on push buttons shall be independent of pressure on push button contacts.

E. Engraved legends in face plates shall have lettering ¼ inch high filled with black paint.

2.28 CORRIDOR POSITION INDICATORS: NEW COMBINATION FIXTURE

A. Remove all existing hall position indicators and hall lanterns at all floors. Provide new L.E.D. digital type hall position indicators. L.E.D. digital readouts shall be a minimum of 2 inches high for direction arrows and floor numbers. Provide separate arrival arrows for up and down direction. Provide white for up and red for down. Provide new wiring. Install cover plate to cover all of existing hole.

B. Corridor position indicator shall be equipped with a clearly audible electronic chime which shall sound once for “UPWARD” bound car and twice for “DOWNWARD” bound car. Audible signal shall not sound when a car passes the floor without stopping.

2.29 HOISTWAY ACCESS SWITCHES: REUSE EXISTING

A. Reuse hoistway access switch(s) for elevator(s) at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. Switches shall be located 6ft. above the floor adjacent to the strike jamb side of the entrance frame. The exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate “UP”, “DOWN”, and “OFF” positions. Each access switch shall be a constant pressure cylinder type with key removable only when switch is in the “OFF” position. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose in the hospital. Arrange the hoistway switch to initiate and maintain movement of the car. When the car is moved from the top terminal landing, limit the zone of travel to a distance of approximately (10 feet) down travel.

2.30 HOISTWAY ENTRANCES FOR ELEVATORS: REUSE

A. Refinish existing entrance frames.

B. Provide new tracks, door hangers, rollers, door gibs, closer units, door pick up and release rollers, arms, beaks and door linkage.

C. Provide new stainless steel hoistway doors on elevators entrances. Door panels shall not be less than 16 gauge sheet steel. Reinforce each door panel for hangers, interlock mechanism and closers. Doors shall meet A17.1 Elevator Code. One door panel for each entrance shall bear a BOCA label or underwriter’s fire rated label. Fasten sight guard, extending full height of panel, to leading edge on side opening door.

D. Reuse existing Braille plates on both sides of door jambs, 5 feet to ctr. above landing sills.

2.31 ELECTRIC INTERLOCKS: NEW

A. Equip each hoistway door with true interlock functioning as hoistway unit system, to prevent operation of car until all hoistway doors are locked in closed position as defined by ASME A17.1. Interlock shall prevent opening of hoistway door from corridor side, unless car is at rest at landing, is operating in leveling zone at landing, or hoistway access switch is used.

B. Hoistway door interlock shall not be accepted, unless is has successfully met requirements of Section 2.12 of ASME A17.1. Securely fasten approved devices to the car and arrange to operate the interlocks without objectionable noise, shock or jar.

C. Equip car doors with electric contact which prevents operation of car until doors are closed as defined in ASME A17.1 unless car is operating in leveling zone or hoistway access switch is used. Locate door contact to prevent its being tampered with from inside of car. Car door contact shall not be accepted, unless it has successfully met requirements of Rule 2.14.4.2 of ASME A17.1.

D. Wiring installed from the hoistway riser to each door interlock shall be NEC type (SF-2), or equivalent.

2.32 ELECTRIC POWER DOOR OPERATORS: NEW

A. Provide a closed loop high performance door operator to automatically open the car and hoistway doors simultaneously after the car is level and automatically close the doors simultaneously at the expiration of the door open timing. The motor shall be of the high internal resistance type, capable of withstanding high currents resulting from stall without damage to the motor. The door operator shall be capable of opening a car door and hoistway door simultaneously, at a maximum speed of not less than two feet per second. The closing speed of the doors shall be one foot per second. A reversal of direction of the doors from the closing to opening operation, whether

initiated by the infrared curtain unit device or the door “OPEN” button, shall be accomplished within no more than 1-1/2 inches maximum of door movement. Particular emphasis is to be placed on obtaining quiet interlock and door operation, and smooth, fast, dynamic braking for door reversals and stopping of the doors reversals, and stopping the door extremes of travel. Construct all levers, operating the doors, of heavy steel members, and all pivot points shall have ball or roller bearings. Use electric power to open and close the doors.

B. Design the door operator so that in case of interruption of failure of the electric power from any cause, it shall permit emergency manual operation of both the car door and the hoistway door from the within the car, at door zone only, outside of door zone, doors are restricted to four inch opening.

1. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone.

C. Provide new PANA 40 PLUS infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully open position should the unit be actuated while the doors are closing. Unit shall function at all times when the doors are not closed, irrespective of all other operating features.

D. Should the doors be prevented from closing for more than predetermined adjustable interval of 20 to 45 seconds by the interruption of failure of the photo-electric curtain unit, door control shall activate door nudging operation, the doors shall close at reduced speed and the nudging buzzer located on the car shall sound. The doors will close in nudging.

E. If an obstruction in the sill should not activate the photo-electric curtain unit door control device and prevent the doors from closing for more than a predetermined adjustable interval of 45 to 90 seconds, the doors shall reverse to the fully open position and re-establish the closing cycle.

F. Provide new Stainless Steel car doors and door clutch assembly with door restrictor.

2.33 CAR SLINGS

A. Reuse existing car slings.

2.34 CAR PLATFORMS: REUSE EXISTING

A. Install new floor covering. Type and color shall be chosen by COTR.

2.35 CAR ENCLOSURES FOR ELEVATORS: INSTALL NEW INTERIOR WALL COVERING

A. Reuse existing cabs. Refinish all existing stainless steel cab panels. Remove existing laminated panels. Install new side and rear wall panels 48 inches from finished floor to ceiling. They shall be covered with new plastic laminate. Apply the plastic laminate to a minimum ½ inch fire rated particle board that meets ASME and Federal requirements. Submit a method of fastening particle board to steel. The particle board shall be one piece on back and side walls. COTR shall choose the color and type of laminate panels.

B. Bolt side exit doors shut. Remove safety switches and cover over doors with new cab interior panels.

C. Install new electrical switch on emergency exit.

D. Reuse existing handrails at 30” and 42” to ctr. above finished floor.

E. Repaint dome bright white. Install new egg create type panels in the existing drop ceiling frame, panel and color to be selected by COTR. Add “T” frames to the middle of each section of drop ceiling if necessary to support ceiling panels.

F. Install new cab ceiling lights. Install 4 sets of T-8 fluorescent light tubs 4 feet long with new ballasts.

G. Provide new fan blower unit.

H. Provide a stainless steel capacity plate on front return panel.

I. Install new GFI electrical receptacle located in front return panel below main car operating panel.

J. Provide elevators with new stainless steel cab doors. Construct door panels to be flush hollow metal construction, not less than one inch thick, consisting of not less than one piece continuous 16 gauge stainless steel on car face side and leading and trailing edges. Separate by two plates of sound deadening material and reinforced by steel shapes welded to the plates at frequent intervals. Reinforce panels as required for installation of hangers, power operating and door operating devices. Hang door on two point suspension hangers having ball bearing sheaves not less than three inches in diameter with rubber or non-metallic sound reducing tires. Equip hanger with adjustable ball rearing rollers to take up thrust of panels. Up thrust roller shall be capable of being locked in position after adjustments to a maximum of 0.015 inch clearance. Provide two non-metallic door gibs on each door panel. Gibs shall be replaceable without removable of door panel.

2.36 AUTO DIAL SYSTEM: NEW

A. Remove existing phone or intercom system located in the cab.

B. Auto dial system shall be provided for each elevator to replace existing phone system. Each auto dial shall have a separate number. Locate auto dial system in auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless steel cover plate. The words “Telephone, Push to Talk” shall be engraved in ¼ inch letters. When activated by the “PUSH TO TALK” button, the auto dial system shall automatically dial a number that is monitored 24 hours a day.

PART 3 - EXECUTION

3.1 SPACE CONDITIONS

A. The elevator machine room shall comply with Sections 3.7 and 2.7 of the ASME A17.1 Code 2005 edition.

B. Attention is called to existing overhead clearance, pit clearances, overall spaces available in hoistway and machine room environmental conditions in connection with completion of specified elevator work. Provide proper, satisfactory and code legal installation of equipment as a whole, including all construction, accessories, and devices in connection with elevator, mechanical and electrical work specified herein.

C. Any construction changes or relocation of equipment, conduit, wiring, etc., required to accomplish the specified elevator installation must be arranged for and obtained by the contractor, subject to the approval of the COTR. Cost of such changes shall be included in the base bid and shall form a part of the contract.

3.2 ARRANGEMENT OF EQUIPMENT

A. Clearance around new elevator, mechanical and electrical equipment shall comply with applicable provisions of NEC. Arrange new equipment so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same area.

3.3 WORKMANSHIP AND PROTECTION

A. All installations shall be made in a first class, neat and skillful manner by mechanics experienced in the trade involved. All details of the

installation shall be mechanically and electrically correct. All materials and equipment shall be new and without imperfections.

B. Recesses, cutouts, slots, holes, patching, grouting, refinishing and the like to accommodate installation of equipment shall be included in the contractor's work. All new holes in concrete shall be core drilled.

C. No structural members shall be cut or altered. Work in place which is damaged or defaced shall be restored equal to original condition.

D. Finished work shall be straight, level and plumb, with true, sharp surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.

E. Where beams, slabs, or other building construction protrude more than two inches into the hoistway, all top surfaces shall be leveled with 20 gauge steel at an angle of at least 75 degrees to the horizontal.

F. If needed, protective enclosures shall be provided around hoistway openings during construction. Enclosure shall remain secured at all times.

G. Contractor shall provide and maintain approved fire extinguishers on site and in the areas where welding or cutting is to occur.

3.4 CLEANING

A. Prior to final acceptance, remove protection from finished or ornamental surfaces, and clean and polish surfaces with due respect to type of material.

3.5 PRETESTS AND TESTS

A. Pretest, as per specifications, the elevators and related equipment, in the presence of the COTR for proper operation before requesting final inspection.

B. Procedure outlined in the Inspection of Elevators, Escalators and Moving Walks (Inspectors Manual ASME A17.2) shall apply.

1. Final test shall be conducted in the presence of and witnessed by the Veterans Administration Consulting Support Service, (00CFM3A) Elevator Engineer.

2. Government shall furnish electric power including necessary current for starting, testing and operating machinery of each elevator.

C. If required by the Veterans Administration elevator engineer, inspection shall be conducted at other than normal working hours.

1. Contractor shall furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked testing weights, voltmeter, center reading ammeter, thermometers, stopwatch, direct reading tachometer and a series of "walkie -talkies" and oil pressure gauges.

2. If during the inspection process, the Veterans Administration representative determines the need, the following instruments should be available within a four-hour period: megohm meter, vibration meter, sound meter and a light meter.

D. Inspection shall be made of workmanship and equipment furnished and installed for compliance with specification.

E. Full Load Run Test: Elevators shall be tested for a period of one hour continuous run with full contract load in the car during the test run, the car shall be stopped at all floors in both directions of travel for a standing period of not less than five nor more than 10 seconds per floor.

F. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with empty load, 50% load, and full load run test. The

actual measured speed of the elevator with all loads in either direction shall be within 10 percent for hydraulic elevators.

1. Full speed runs shall be quiet and free from vibration and sway.

G. The amp readings of the car in the up direction at full load shall not exceed the amp reading on the elevator motor data plate.

H. Temperature Rise Test: The temperature rise of the motor shall be determined during the full load test run. Temperatures shall be measured by the use of the thermometers. Under these conditions, the temperature rise of the equipment shall not exceed 40 degrees Centigrade above ambient temperature. Test shall be started only when parts of equipment are within five degrees Centigrade of the ambient temperature at time of starting test. Other tests for heat runs on motors shall be as specified in the latest procedure of the Institute of Electrical and Electronic Engineers.

I. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car, 50% load in car and with contract load in car, in both directions of travel. Accuracy of floor leveling shall be within plus or minus 1/8 inch of level with any landing floor for which the stop has been initiated (with a definite range of distance in advance of the landing) regardless of load in car or direction. The car leveling device shall automatically correct over travel and shall maintain the car floor within plus or minus 1/8 inch or level with the landing floor regardless of change in load.

J. Insulation Resistance Test; The elevator’s complete wiring system shall be free from short circuits and grounds and the insulation resistance of the system shall be determined by use of megohmmeter, at the discretion of the Veterans Administration representative conducting the test.

K. Overload devices: Test all overload current protection devices in the system at final inspection.

L. Operating and signal systems. Operate the car by the operating devices provided. The operation signals and automatic floor leveling shall function in accordance with the requirements specified. Starting, stopping and leveling shall be smooth and comfortable, without bumps or jars.

M. Working pressure. Verify working pressure of the hydraulic system by pressure gauges placed in the system line. Take readings in the machine room with no load, 50% load, and full load in car.

N. Test automatic shutoff valve for proper operation.

O. Evidence of malfunction in any tested system or parts of equipment or component part thereof that occurs during, or as a result of, the tests, shall be corrected, repaired, or replaced at no additional cost to the Government, and the test repeated.

P. If equipment fails, test requirements and re-inspection is required. The Contractor shall be responsible for costs of re-inspection, including salaries, transportation expenses and other expenses of the representatives of the COTR.

Q. Limit Stops:

1. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at contract speed for both tests. Normal limit stopping devices shall be inoperative for the tests.

R. Setting of Car Door Contacts; the position of the car door at which the elevator may be started shall be measured. The distance from full closure

shall not exceed that required by the code. The test shall be made with the hoistway doors closed or the hoistway door contact inoperative

S. Setting of interlocks: The position of the hoistway door at which the elevator may be started shall be measured and shall not exceed the Code Requirements.

3.6 PAINTING AND FINISHING

A. Upon completion of installation and prior to final inspection, all equipment shall be thoroughly cleansed of grease, oil, cement, plaster and other debris.

B. Elevator pump units, controllers, main line shunt trip disconnect switches, inside of hoistway doors, and cross heads of cars shall be identified by 4-inch high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be stenciled.

C. Surfaces of door frames, door panels, interior cab surfaces, etc., that become damaged or marred from any cause during construction shall be restored to original condition in a satisfactory manner before final acceptance of work.

3.7 INSTRUCTION OF PERSONNEL

A. Provide competent instructors to train qualified VA personnel in operation of the equipment and accessories installed under this contract, for a period of not less than eight hour. Instruction shall commence after completion of all work and at the date and time chosen by the COTR.

B. In addition to oral instruction, written instructions in triplicate relative to care, adjustment and operation of all equipment and accessories shall be furnished and delivered to the COTR in independently bound folders. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electric apparatus including location of each device, complete replacement parts lists with descriptive literature and identification and diagrammatic cuts of equipment and parts. Information shall also include electrical operation characteristics of all circuits, fields, relays, timers, regulators and electronic devices.

C. Provide any supplementary instruction for adjustment and care of new equipment that may become necessary because of changes, modifications and/or replacement of equipment of operation under requirements of paragraph entitled “GUARANTEE.”

3.8 INSPECTIONS AND MAINTENANCE

A. Furnish all material and labor for complete maintenance and inspection service on elevator installation for a period of (1) one year after completion and acceptance of the complete elevator installation by the COTR. This maintenance service period shall begin with the acceptance of the last elevator and shall run concurrently with the guarantee. Maintenance work shall be performed by skilled elevator personnel directly employed and supervised by the same company that furnished and installed the elevator equipment specified herein. The elevator contractor shall provide maintenance on elevators listed in specifications when project has been awarded.

B. The maintenance service shall include the following:

1. Bi-weekly systematic examination of the hydraulic equipment as per manufacturer’s recommendations.

2. Cleaning, lubricating, adjusting, repairing and replacing of all parts as necessary to keep the equipment in working order.

3. Furnishing all lubricant, cleaning materials and parts required.

4. The performance standards set forth in this specification, including flight time, cycle time, and door times shall be maintained at all times.

5. The operational system shall be maintained to the standards specified hereinafter including any changes or adjustments required to meet varying conditions of hospital occupancy.

6. Maintain smooth starting and stopping and accurate leveling at all times.

C. Maintenance service shall not include the performance of any work required as a result of improper use, accidents, or negligence for which the contractor is not directly responsible.

D. Provide 24 hour emergency call-back service which shall consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency trouble develop between regular examinations and one hour for “trap calls”.

E. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of the equipment and persons in and about the elevator.

F. Service and emergency personnel shall report to the authorized representative upon arrival at the hospital and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed shall be given to the authorized representative.

G. The contractor shall maintain a log in the machine room. The log shall list the date and time of all bi-weekly examinations and trouble calls. Each trouble call shall be fully described including the nature of the call, necessary correction performed or parts replaced.

H. After signing contract, the elevator contractor shall maintain all elevators listed in this contract during the project renovation period. This is separate from the one year maintenance contract which starts with the completion of the acceptance of final elevator in this elevator project.

- - - END - - -

SECTION 16050 EVL.
BASIC METHODS AND REQUIREMENTS (ELECTRICAL)

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section, Basic Methods and Requirements (Electrical) applies to all sections of Division 16.

B. Furnish and install electrical wiring, systems, equipment and accessories in accordance with the specifications and drawings. Capacities and ratings of motors, transformers, cable, switchboards, switchgear, panelboards, motor control centers, and other items and arrangements for the specified items are shown on drawings.

C. Electrical service entrance equipment (arrangements for temporary and permanent connections to the power company's system) shall conform to the power company's requirements. Coordinate fuses, circuit breakers and relays with the power company's system, and obtain power company approval for sizes and settings of these devices.

D. Wiring ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways accordingly sized. Aluminum conductors are prohibited.

1.2 MINIMUM REQUIREMENTS

A. References to the National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), and National Fire Protection Association (NFPA) are minimum installation requirement standards.

B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

1.3 TEST STANDARDS

A. All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc., standards where test standards have been established. Equipment and materials which are not covered by UL Standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as NEMA, or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.

B. Definitions:

1. Listed; equipment or device of a kind mentioned which:
   a. Is published by a nationally recognized laboratory which makes periodic inspection of production of such equipment.
   b. States that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.
2. Labeled; equipment or device is when:
   a. It embodies a valid label, symbol, or other identifying mark of a nationally recognized testing laboratory such as Underwriters Laboratories, Inc.
   b. The laboratory makes periodic inspections of the production of such equipment.
   c. The labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.
3. Certified; equipment or product is which:
   a. Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner.
   b. Production of equipment or product is periodically inspected by a nationally recognized testing laboratory.
   c. Bears a label, tag, or other record of certification.
4. Nationally recognized testing laboratory; which is approved, in accordance with OSHA regulations, by the Secretary of Labor.

1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)

A. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.

B. Product Qualification:
   1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
   2. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

1.5 MANUFACTURED PRODUCTS

A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts shall be available.

B. When more than one unit of the same class of equipment is required, such units shall be the product of a single manufacturer.

C. Equipment Assemblies and Components:
   1. Components of an assembled unit need not be products of the same manufacturer.
   2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
   3. Components shall be compatible with each other and with the total assembly for the intended service.
   4. Parts which are similar shall be the product of a single manufacturer.

D. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.

E. When Factory Testing Is Specified:
   1. The Government shall have the option of witnessing factory tests. The contractor shall notify the VA through the Project Engineer a minimum of 15 working days prior to the manufacturers making the factory tests.
   2. Four copies of certified test reports containing all test data shall be furnished to the Project Engineer prior to final inspection and not more than 90 days after completion of the tests.
   3. When equipment fails to meet factory test and reinspection is required, the contractor shall be liable for all additional expenses, including expenses of the Government.

1.6 EQUIPMENT REQUIREMENTS

Where variations from the contract requirements are requested in accordance with Section 01001, GENERAL CONDITIONS and Section 01340, SAMPLES AND SHOP DRAWINGS, the connecting work and related components shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

1.7 EQUIPMENT PROTECTION

Equipment and materials shall be protected during shipment and storage against physical damage, dirt, moisture, cold and rain.

A. During installation, enclosures, equipment, controls, controllers, circuit protective devices, and other like items, shall be protected against entry of foreign matter; and be vacuum cleaned both inside and outside before testing and operating and repainting if required.

B. Damaged equipment shall be, as determined by the Project Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.

C. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.

D. Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.8 WORK PERFORMANCE

A. Arrange, phase and perform work to assure electrical service for other buildings at all times. Refer to Article OPERATIONS AND STORAGE AREAS under Section 01010, GENERAL REQUIREMENTS.

B. New work shall be installed and connected to existing work neatly and carefully. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Section 01010, GENERAL REQUIREMENTS.

C. Coordinate location of equipment and conduit with other trades to minimize interferences. See Section 01001, GENERAL CONDITIONS.

1.9 EQUIPMENT INSTALLATION AND REQUIREMENTS

A. Equipment location shall be as close as practical to locations shown on the drawings.

B. Working spaces shall not be less than specified in the NEC for all voltages specified.

C. Inaccessible Equipment:

1. Where the Government determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Government.
2. "Conveniently accessible" is defined as being capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping, and ductwork.

1.10 EQUIPMENT IDENTIFICATION

A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.

B. Nameplates shall be laminated black phenolic resin with a white core with engraved lettering, a minimum of 6 mm (1/4-inch) high. Secure nameplates with screws. Nameplates that are furnished by manufacturer as

a standard catalog item, or where other method of identification is herein specified, are exceptions.

1.11 SUBMITTALS

A. Submit in accordance with section 01340, SAMPLES AND SHOP DRAWINGS.

B. The Government's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.

C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.

D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1. Mark the submittals, "SUBMITTED UNDER SECTION “14225".
2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
3. Submit each section separately.

E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
2. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
3. Parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price and availability of each part.

F. Manuals: Submitted in accordance with Section 01010, GENERAL REQUIREMENTS.

1. Maintenance and Operation Manual: Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders, (manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.

2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
4. The manual shall include:
   a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
   b. A control sequence describing start-up, operation, and shutdown.
   c. Description of the function of each principal item of equipment.
   d. Installation and maintenance instructions.
   e. Safety precautions.
   f. Diagrams and illustrations.
   g. Testing methods.
   h. Performance data.
   i. Lubrication schedule including type, grade, temperature range, and frequency.
   j. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
   k. Appendix; list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

G. Approvals will be based on complete submission of manuals together with shop drawings.

1.12 SINGULAR NUMBER

A. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

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SECTION 16111 EVL.
CONDUIT SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation, and connection of conduit, fittings, and boxes to form complete, coordinated, grounded raceway systems. Raceways are required for all wiring unless shown or specified otherwise.

B. Definitions: The term conduit, as used in this specification, shall mean any or all of the raceway types specified.

1.2 RELATED WORK

A. General electrical requirements and items that are common to more than one section of DIVISION 16: Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

B. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents: Section 16450, GROUNDING.

1.3 SUBMITTALS

In accordance with Section 01340, SAMPLES AND SHOP DRAWINGS, furnish the following:

A. Shop Drawings:

1. Size and location of main feeders. Size and location of panels and pull boxes. Layout of required conduit penetrations through structural elements.
2. The specific item proposed and its area of application shall be marked on the catalog cuts.

B. Certification: Prior to final inspection, deliver to the Project Engineer four copies of the certification that the material is in accordance with the drawings and specifications and has been properly installed.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. National Fire Protection Association (NFPA):

70- (latest).....National Electrical Code (NEC)

C. Underwriters Laboratories, Inc. (UL):

1-93.....Flexible Metal Conduit

5-96.....Surface Metal Raceway and Fittings

6-97.....Rigid Metal Conduit

50-95.....Enclosures for Electrical Equipment
467-93.....Grounding and Bonding Equipment
514A-96.....Metallic Outlet Boxes
514B-97.....Fittings for Cable and Conduit
651-95.....Schedule 40 and 80 Rigid PVC Conduit
651A-95.....Type EB and A Rigid PVC Conduit and HDPE Conduit
797-93.....Electrical Metallic Tubing
1242-96.....Intermediate Metal Conduit

PART 2 - PRODUCTS

2.1 MATERIAL

A. Conduit Size: In accordance with the NEC, but not less than (3/4 inch) unless otherwise shown. Where permitted by the NEC, (1/2 inch) flexible conduit may be used for tap connections to recessed lighting fixtures.

B. Conduit:
   1. Rigid steel: UL 6.
   2. Rigid aluminum: UL 6
   3. Rigid intermediate steel conduit (IMC): UL 1242.
   4. Electrical metallic tubing (EMT): U.L. 797. Maximum size 125 mm (5 inch). Permitted only with cable rated 600 volts or less.
   5. Flexible steel conduit (commercial greenfield): UL 1.
   6. Liquid-tight flexible metal conduit: Flexible galvanized steel tubing covered with extruded liquid-tight jacket of polyvinyl chloride (PVC). Provide conduit with a continuous copper bonding conductor wound spirally between the convolutions.

C. Conduit Fittings:
   1. Rigid steel and IMC conduit fittings:
      a. Standard threaded couplings, locknuts, bushings, and elbows: Only steel or malleable iron materials are acceptable. Integral retractable type IMC couplings are acceptable also.
      b. Locknuts: Bonding type with sharp edges for digging into the metal wall of an enclosure.
      c. Bushings: Metallic insulating type, consisting of an insulating insert molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.
      d. Erickson (union-type) and set screw type couplings: Approved for use in concrete are permitted for use to complete a conduit run where conduit is installed in concrete. Use set screws of case hardened steel with hex head and cup point to firmly seat in conduit wall for positive ground. Tightening of set screws with pliers is prohibited.

e. Sealing fittings: Threaded cast iron type. Use continuous drain type sealing fittings to prevent passage of water vapor. In concealed work, install fittings in flush steel boxes with blank coverplates having the same finishes as that of other electrical plates in the room.

2. Rigid aluminum conduit fittings:
   a. Standard threaded couplings, locknuts, bushings, and elbows: Malleable iron, steel or aluminum alloy materials. Zinc or cadmium plate iron or steel fittings. Aluminum fittings containing more than 0.4 percent copper are prohibited.
   b. Locknuts and bushings: As specified for rigid steel and IMC conduit.
   c. Set screw fittings: Not permitted for use with aluminum conduit.
3. Electrical metallic tubing fittings:
   a. Only steel or malleable iron material are acceptable.
   b. Couplings and connectors: Concrete tight and rain tight, with connectors having insulated throats. Use gland and ring compression type couplings and connectors for conduit sizes 50 mm (2 inches) and smaller. Use set screw type couplings with four set screws each for conduit sizes over 50 mm (2 inches). Use set screws of case-hardened steel with hex head and cup point to firmly seat in wall of conduit for positive grounding.
   c. Indent type connectors or couplings are prohibited.
   d. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
4. Flexible steel conduit (greenfield) fittings:
   a. UL 5. Only steel or malleable iron materials are acceptable.
   b. Clamp type, with insulated throat.
5. Liquid-tight flexible metal conduit fittings:
   a. Only steel or malleable iron materials are acceptable.
   b. Fittings must incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats.
6. Direct burial plastic conduit fittings: As recommended by the conduit manufacturer.
7. Surface metal raceway fittings: As recommended by the raceway manufacturer.
8. Expansion and deflection couplings:
   a. UL 467 and UL 514B.

b. Accommodate, 19 mm (0.75 inch) deflection, expansion, or contraction in any direction, and allow 30 degree angular deflections.
c. Include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC code tables for ground conductors.
d. Jacket: Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber material with stainless steel jacket clamps.

D. Conduit Supports:
1. Parts and hardware: Zinc-coat or provide equivalent corrosion protection.
2. Individual Conduit Hangers: Designed for the purpose, having a pre-assembled closure bolt and nut, and provisions for receiving a hanger rod.
3. Multiple conduit (trapeze) hangers: Not less than 38 mm by 38 mm (1-1/2 by 1-1/2 inch), 12 gage steel, cold formed, lipped channels; with not less than 9 mm (3/8 inch) diameter steel hanger rods.
4. Solid Masonry and Concrete Anchors: Self-drilling expansion shields, or machine bolt expansion.

E. Outlet, Junction, and Pull Boxes:
1. UL-50 and UL-514A.
2. Cast metal where required by the NEC or shown, and equipped with rustproof boxes.
3. Sheet metal boxes: Galvanized steel, except where otherwise shown.

F. Wireways: Equip with hinged covers, except where removable covers are shown.

PART 3 - EXECUTION

3.1 PENETRATIONS

A. Cutting or Holes:
1. Locate holes in advance where they are proposed in the structural sections such as ribs or beams. Obtain the approval of the Project Engineer prior to drilling through structural sections.
2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Project Engineer as required by limited working space.

B. Fire Stop: Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the

spread of fire, smoke and gases, with rock wool fiber or silicone foam sealant only. Completely fill and seal clearances between raceways and openings with the fire stop material.

C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight.

3.2 CONDUIT SYSTEMS INSTALLATION, GENERAL

A. Installation: In accordance with UL, NEC, as shown, and as hereinafter specified.

B. Essential (Emergency) raceway systems: Install entirely independent of other raceway systems, except where specifically "excepted" by NEC Article 517.

C. Install conduit as follows:

1. In complete runs before pulling in cables or wires.
2. Flattened, dented, or deformed conduit is not permitted. Remove and replace the damaged conduits with new undamaged material.
3. Assure conduit installation does not encroach into the ceiling height head room, walkways, or doorways.
4. Cut square with a hacksaw, ream, remove burrs, and draw up tight.
5. Mechanically and electrically continuous.
6. Independently support conduit. Do not use other supports i.e., (suspended ceilings, suspended ceiling supporting members, lighting fixtures, mechanical piping, or mechanical ducts).
7. Support within 300 mm (one foot) of changes of direction, and within one foot of each enclosure to which connected.
8. Close ends of empty conduit with plugs or caps at the rough-in stage to prevent entry of debris, until wires are pulled in.
9. Secure conduits to cabinets, junction boxes, pull boxes and outlet boxes with bonding type locknuts. For rigid and IMC conduit installations, provide a locknut on the inside of the enclosure, made up wrench tight. Do not make conduit connections to junction box covers.

D. Conduit Bends:

1. Make bends with standard conduit bending machines.
2. Conduit hickey may be used for slight offsets, and for straightening stubbed out conduits.
3. Bending of conduits with a pipe tee or vise is prohibited.

E. Layout and Homeruns:

1. Install conduit with wiring, including homeruns, as shown.
2. Deviations: Make only where necessary to avoid interferences and only after drawings showing the proposed deviations have been submitted to and have been approved by the Resident Engineer.

3.3 CONCEALED WORK INSTALLATION

A. Above Furred or Suspended Ceilings and in Walls:
   1. Conduit for conductors 600 volts and below:
      a. Rigid steel, IMC, rigid aluminum, or EMT. Types mixed indiscriminately in the same system is prohibited.
      b. Do not use aluminum in wet locations.
   2. Align and run conduit parallel or perpendicular to the building lines.
   3. Connect recessed lighting fixtures to conduit runs with maximum 1800 mm (six feet) of flexible metal conduit extending from a junction box to the fixture.
   4. Tightening set screws with pliers is prohibited.

3.4 EXPOSED WORK INSTALLATION

A. Conduit for Conductors 600 volts and below:
   1. Rigid steel, IMC, rigid aluminum, or EMT. Types mixed indiscriminately in the system is prohibited.
   2. Do not use aluminum in wet locations.
B. Align and run conduit parallel or perpendicular to the building lines.
C. Install horizontal runs close to the ceiling or beams and secure with conduit straps.
D. Support horizontal or vertical runs at not over 2400 mm (eight foot) intervals.
E. Surface metal raceways: Use only where shown.

3.5 HAZARDOUS LOCATIONS

A. Use rigid steel conduit only, notwithstanding requirements otherwise specified in this or other sections of these specifications.
B. Install UL approved sealing fittings, that prevent passage of explosive vapors, in hazardous areas equipped with explosive proof lighting fixtures, switches, and receptacles, as required by the NEC.

3.6 WET OR DAMP LOCATIONS

A. Unless otherwise shown, use conduits of rigid steel or IMC.
B. Provide sealing fittings, to prevent passage of water vapor, where conduits pass from warm to cold locations, i.e., (refrigerated spaces, constant temperature rooms, air conditioned spaces building exterior walls, roofs) or similar spaces.
C. Unless otherwise shown, use rigid steel or IMC conduit within 1500 mm (five feet) of the exterior and below concrete building slabs in contact with soil, gravel, or vapor barriers. Conduit shall include an outer factory coating of .5 mm (20 mil) bonded PVC or field coat with

asphaltum before installation. After installation, completely coat damaged areas of coating.

3.7 MOTORS AND VIBRATING EQUIPMENT

Use flexible metal conduit for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission. Provide liquid-tight flexible metal conduit for installation in exterior locations, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, inside (air stream) of HVAC units, and locations subject to seepage or dripping of oil, grease or water. Provide a green ground wire with flexible metal conduit.

3.8 CONDUIT SUPPORTS, INSTALLATION

A. Safe working load shall not exceed 1/4 of proof test load of fastening devices.

B. Use pipe straps or individual conduit hangers for supporting individual conduits.

C. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 90 kg (200 pounds). Attach each conduit with U-bolts or other approved fasteners.

D. Support conduit independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.

E. Fasteners and Supports in Solid Masonry and Concrete:

1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
2. Existing Construction:
   a. Steel expansion anchors not less than 6 mm (1/4 inch) bolt size and not less than 28 mm (1-1/8 inch) embedment.
   b. Power set fasteners not less than 6 mm (1/4 inch) diameter with depth of penetration not less than 75 mm (3 inches).
   c. Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.

F. Hollow Masonry: Toggle bolts are permitted. Bolts supported only by plaster are not acceptable.

G. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.

H. Attachment by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.

I. Chain, wire, or perforated strap shall not be used to support or fasten conduit.

J. Spring steel type supports or fasteners are prohibited for all uses except: Horizontal and vertical supports/fasteners within walls.

K. Vertical Supports: Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.

3.9 BOX INSTALLATION

A. Boxes for Concealed Conduits:
   1. Mount flush.
   2. Provide raised covers for boxes to suit the wall or ceiling, construction and finish.

B. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling in operations.

C. Remove only knockouts as required and plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.

D. Outlet boxes in the same wall mounted back-to-back are prohibited.

E. Minimum size of outlet boxes for ground fault interrupter (GFI) receptacles is 100 mm (4 inches) square by 55 mm (2-1/8 inches) deep, with device covers for the wall material and thickness involved.

F. Stencil or install phenolic nameplates on covers of boxes identified on riser diagrams. For example "SIG-FA JB No. 1".

3.10 TELEPHONE CONDUIT

A. Install the telephone raceway system as shown on drawings.

B. Minimum conduit size of 19 mm (3/4 inch), but not less than the size shown on the drawings.

C. All conduit ends shall be equipped with insulated bushings.

D. All 100 mm (four inch) conduits within buildings shall include pull boxes after every two 90 degree bends. Size per the NEC.

E. Vertical conduits/sleeves through closets floors shall terminate not less than 75 mm (3 inches) below the floor and not less than 75 mm (3 inches) below the ceiling of the floor below.

F. Terminate conduit runs to/from a telephone backboard in a closet or interstitial space at the top or bottom of the backboard. Conduits shall enter telephone closets next to the wall and be flush with the backboard.

G. Were drilling is necessary for vertical conduits, locate holes so as not to affect structural sections such as ribs or beams.

H. All empty conduits located in telephone closets or on telephone backboards shall be sealed with a standard non-hardening duct seal compound to prevent the entrance of moisture and gases and to meet fire resistance requirements.

I. Conduit runs shall contain no more than four quarter turns (90 degree bends) between pull boxes/backboards. Minimum radius of telephone conduit bends shall be as follows (special long radius):

Sizes of Conduit Trade Size	Radius of Conduit Bends mm, Inches
3/4	150 (6)
1	230 (9)
1-1/4	350 (14)
1-1/2	430 (17)
2	525 (21)
2-1/2	635 (25)
3	775 (31)
3-1/2	900 (36)
4	1125 (45)

J. Furnish and install pull wire in all empty conduits. (Sleeves through floor are exceptions).

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SECTION 16127 EVL.
CABLES, LOW VOLTAGE (600 VOLTS AND BELOW)

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation, and connection of the low voltage power and lighting wiring.

1.2 RELATED WORK

A. General electrical requirements that are common to more than one section in Division 16: Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

B. Conduits for cables and wiring: Section 16111, CONDUIT SYSTEMS.

C. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents: Section 16450, GROUNDING.

1.3 SUBMITTALS

In accordance with section 01340, SAMPLES AND SHOP DRAWINGS, furnish the following:

A. Manufacturer's Literature and Data: Showing each cable type and rating.

B. Certificates: Two weeks prior to final inspection, deliver to the Project Engineer four copies of the certification that the material is in accordance with the drawings and specifications and has been properly installed.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are reference in the text by the basic designation only.

B. Federal Specifications (Fed. Spec.):

J-C-30B-89.....Cable and Wire, Electrical

HH-I-595C-76.....Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

W-F-406E-93.....Fittings for Cable, Power, Electrical And Conduit, Metal, Flexible

C. National Fire Protection Association (NFPA):

70-(latest).....National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):

4-96.....Armored Cable

44-99.....Thermoset-Insulated Wires and Cables

83-98.....Thermoplastic-Insulated Wires and Cables

467-93.....Electrical Grounding and Bonding Equipment

486A-97.....Wire Connectors and Soldering Lugs for Use with Copper Conductors
486C-97.....Splicing Wire Connectors
486D-97.....Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations
486E-94.....Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
493-95.....Thermoplastic-Insulated Underground Feeder and Branch Circuit Cable
514B-97.....Fittings for Cable and Conduit
1479-94.....Fire Tests of Through-Penetration Fire Stops

PART 2 - PRODUCTS

2.1 CABLE AND WIRE (POWER AND LIGHTING)

A. Cable and Wire shall be in accordance with Fed. Spec. J-C-30B, except as hereinafter specified.

B. Single Conductor:
   1. Annealed copper.
   2. Shall be stranded for sizes No. 8 AWG and larger, solid for sizes No. 10 AWG and smaller.
   3. Shall be minimum size No. 12 AWG, except where smaller sizes are allowed herein.

C. Insulation:
   1. THW, XHHW, or dual rated THHN-THWN shall be in accordance with UL 44, and 83.
   2. Isolated power system wiring: Type XHHW with a dielectric constant of 3.5 or less.

D. Color Code:
   1. Secondary service, feeder and branch circuit conductors shall be color coded as follows:

208/120 volt	Phase	480/277 volt
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray *
* or white with colored (other than green) tracer.		

   2. Use solid color compound or solid color coating for No. 12 AWG and No. 10 AWG branch circuit conductors and neutral sizes.
   3. Phase conductors No. 8 AWG and larger shall be color-coded using one of the following methods:

a. Solid color compound or solid color coating.
b. Stripes, bands, or hash marks of color specified above.
c. Color as specified using 19 mm (3/4 inch) wide tape. Apply tape in half overlapping turns for a minimum of 75 mm (three inches) for terminal points, and in junction boxes, pull boxes, troughs, manholes, and handholes. Apply the last two laps of tape with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable stating size and insulation type.

4. For modifications and additions to existing wiring systems, color coding shall conform to the existing wiring system.
5. Color code for isolated power system wiring shall be in accordance with the NEC.

2.2 SPLICES AND JOINTS

A. In accordance with UL 486A, C, D, E and NEC.
B. Branch circuits (No. 10 AWG and smaller):
   1. Connectors: Solderless, screw-on, reusable pressure cable type, 600 volt, 105 degree C with integral insulation, approved for copper and aluminum conductors.
   2. The integral insulator shall have a skirt to completely cover the stripped wires.
   3. The number, size, and combination of conductors, as listed on the manufacturers packaging shall be strictly complied with.
C. Feeder Circuits:
   1. Connectors shall be indent, hex screw, or bolt clamp-type of high conductivity and corrosion-resistant material.
   2. Field installed compression connectors for cable sizes 250 kcmil and larger shall have not less than two clamping elements or compression indents per wire.
   3. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Insulate with not less than that of the conductor level that is being joined.
   4. Plastic electrical insulating tape: Fed Spec. HH-I-595 shall apply, flame retardant, cold and weather resistant.

2.3 CONTROL WIRING

A. Unless otherwise specified in other sections of these specifications, control wiring shall be as specified for power and lighting wiring, except the minimum size shall be not less than No. 14 AWG.
B. Control wiring shall be large enough so that the voltage drop under inrush conditions does not adversely affect operation of the controls.

2.4 COMMUNICATION AND SIGNAL WIRING

A. Shall conform to the recommendations of the manufacturers of the communication and signal systems; however, not less than what is shown.
B. Wiring shown is for typical systems. Provide wiring as required for the systems being furnished.
C. Multi-conductor cables shall have the conductors color coded.

2.5 WIRE LUBRICATING COMPOUND

A. Suitable for the wire insulation and conduit it is used with, and shall not harden or become adhesive.
B. Shall not be used on wire for isolated type electrical power systems.

2.6 FIREPROOFING TAPE

A. The tape shall consist of a flexible, conformable fabric of organic composition coated one side with flame-retardant elastomer.
B. The tape shall be self-extinguishing and shall not support combustion. It shall be arcproof and fireproof.
C. The tape shall not deteriorate when subjected to water, gases, salt water, sewage, or fungus and be resistant to sunlight and ultraviolet light.
D. The finished application shall withstand a 200-ampere arc for not less than 30 seconds.
E. Securing tape: Glass cloth electrical tape not less than 0.18 mm (7 mils) thick, and 19 mm (3/4 inch) wide.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERALLY

A. Install in accordance with the NEC, and as specified.
B. Install all wiring in raceway systems, except where direct burial or HCF Type AC cables are used.
C. Splice cables and wires only in outlet boxes, junction boxes and pull boxes.
D. Install cable supports for all vertical feeders in accordance with the NEC. Provide split wedge type which firmly clamps each individual cable and tightens due to cable weight.
E. For panelboards, cabinets, wireways, switches, and equipment assemblies, neatly form, train, and tie the cables in individual circuits.
F. Seal cable and wire entering a building from underground, between the wire and conduit where the cable exits the conduit, with a nonhardening approved compound.
G. Wire Pulling:
   1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.

2. Use ropes made of nonmetallic material for pulling feeders.
3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors, as approved by the Resident Engineer.
4. Pull in multiple cables together in a single conduit.

3.2 SPLICE INSTALLATION

A. Splices and terminations shall be mechanically and electrically secure.
B. Where the Government determines that unsatisfactory splices or terminations have been installed, remove the devices and install approved devices at no additional cost to the Government.

3.3 CONTROL, COMMUNICATION AND SIGNAL WIRING INSTALLATION

A. Unless otherwise specified in other sections of these specifications, install wiring and connect to perform the functions shown and specified in other sections of these specifications.
B. Except where otherwise required, install a separate power supply circuit for each system so that malfunctions in any system will not affect other systems.
C. Where power supply circuits are not shown for systems, connect them to the nearest panelboards of suitable voltages, which are intended to supply such systems and have suitable spare circuit breakers or space for installation.
D. Install a red warning indicator on the handle of the branch circuit breaker for the power supply circuit for each system to prevent accidental de-energizing of the systems.
E. System voltages shall not exceed 120 volts and shall be lower voltages where shown on the drawings or required by the NEC.

3.4 CONTROL, COMMUNICATION AND SIGNAL SYSTEM IDENTIFICATION

A. Install a permanent wire marker on each wire at each termination.
B. Identifying numbers and letters on the wire markers shall correspond to those on the wiring diagrams used for installing the systems.
C. Wire markers shall retain their markings after cleaning.

3.5 FEEDER IDENTIFICATION

A. In each interior, pullbox and junction box, install metal tags on each circuit cables and wires to clearly designate their circuit identification and voltage.
B. In manholes and handholes, provide tags of the embossed brass type, and also show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.6 FIELD TESTING

A. Feeders and branch circuits shall have their insulation tested after installation and before connection to utilization devices such as fixtures, motors, or appliances.
B. Tests shall be performed by megger and conductors shall test free from short-circuits and grounds.
C. Test conductors phase-to-phase and phase-to-ground.
D. The Contractor shall furnish the instruments, materials, and labor for these tests.

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SECTION 16140 EVL.
WIRING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of wiring devices.

1.2 RELATED WORK

A. General electrical requirements that are common to more than one section of Division 16: Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

B. Conduits and outlets boxes: Section 16111, CONDUITS SYSTEMS

C. Cables and wiring: Section 16127, CABLES, LOW VOLTAGE (600 VOLTS AND BELOW).

D. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents: Section 16450, GROUNDING.

1.3 SUBMITTALS

In accordance with section 01340, SAMPLES AND SHOP DRAWINGS, furnish the following:

A. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting details, construction materials, grade, and termination information.

B. Manuals: Two weeks prior to final inspection, deliver four copies of the following to the Project Engineer.

1. Technical data sheets and information for ordering replacement units.

C. Certifications: Two weeks prior to final inspection, deliver to the Project Engineer four copies of the following:

1. Certification by the Contractor that the devices comply with the drawings and specifications, and have been properly installed, aligned, and tested.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.

B. National Fire Protection Association (NFPA):
70-(latest).....National Electrical Code (NEC)

C. National Electrical Manufacturers Association (NEMA):
WD1-83.....General Requirements for Wiring Devices

WD6-88.....Wiring Devices – Dimensional Requirements

D. Underwriter’s Laboratories, Inc. (UL):

5-96.....Surface Metal Raceways and Fittings

20-95.....General-Use Snap Switches

231-98.....Power Outlets

467-93.....Grounding and Bonding Equipment

498-96.....Attachment Plugs and Receptacles

943-93.....Ground Fault Circuit Interrupters

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. General: All receptacles shall be listed by Underwriters Laboratories, Inc., as hospital grade (green dot identification) and conform to NEMA WD1. (EXCEPTION - Receptacle types which have no listing as hospital grade but are listed by UL in their respective categories or receptacles indicated on the drawings as “not hospital grade”).

1. Mounting straps shall be plated steel, with beak-off plaster ears and shall include a self grounding feature. Terminal screws shall be brass, brass plated or a copper alloy metal.
2. Receptacles shall have provisions for back wiring with separate metal clamp type terminals (four min.) and side wiring from four captively held binding screws.

B. Duplex receptacles shall be single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD6. The duplex type shall have break-off feature for two circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal.

1. Bodies shall be ivory in color.
2. Switched duplex receptacles shall be wired so that only the top receptacle is switched. The remaining receptacle shall be unswitched.
3. Duplex Receptacles on Emergency Circuit:
   a. Bodies shall be red in color. Wall plates shall be red with the word "emergency" engraved in 6 mm, (1/4 inch) white letters on cover.
4. Ground Fault Interrupter Duplex Receptacles: Shall be an integral unit suitable for mounting in a standard outlet box.
   a. Ground fault interrupter, shall be hospital grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20 ampere branch circuit. Device shall have nominal sensitivity to ground leakage current of five milliamperes and shall function to interrupt the current supply for any value

of ground leakage current above five milliamperes on the load side of the device. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.

5. Safety Type Duplex Receptacles:
   a. Bodies shall be gray in color.
   b. Shall be hospital grade, except that the rating shall be 15 ampere, with the following additional requirements.
      1) Shall permit current to flow only while a standard plug is in the proper position in the receptacle.
      2) Screws exposed while the wall plates are in place shall be the tamperproof type.
6. Isolated Ground Type Duplex Receptacles:
   a. Bodies shall be orange in color.
   b. Shall be hospital grade and UL listed as “Isolated Ground”.
7. Duplex Receptacles (not hospital grade): Shall be the same as hospital grade duplex receptacles except for the "hospital grade" listing and as follows.
   a. Bodies shall be brown phenolic compound supported by a plated steel mounting strap having plaster ears.
   b. Shall be NEMA WD1 heavy duty type.

C. Receptacles 20, 30 and 50 Ampere, 250 Volt: Shall be complete with appropriate cord grip plug. Devices shall meet UL 231.

D. Weatherproof Receptacles: Shall consist of a duplex receptacle, mounted in box with a gasketed, weatherproof, cast metal cover plate and cap over each receptacle opening. The cap shall be permanently attached to the cover plate by a spring hinged flap. The weatherproof integrity shall not be affected when heavy duty specification or hospital grade attachment plug caps are inserted. Cover plates on outlet boxes mounted flush in the wall shall be gasketed to the wall in a watertight manner.

E. Lamp Receptacles for Outlet Box Mounting:
   1. For use on standard 75 mm (3 inch) and 100 mm (4 inch) outlet boxes.
   2. Keyless, porcelain body and skirt supporting a medium screw shell socket, and integral 3-wire grounding receptacle shall have screw terminals and a minimum rating of 600 watts.
   3. Porcelain neck shall have shade holder groove.

2.2 TOGGLE SWITCHES

A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles shall be ivory in color unless otherwise specified. The rocker type switch is not acceptable and will not be approved.

1. Switches installed in hazardous areas shall be explosion proof type in accordance with the NEC and as shown on the drawings.
2. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self grounding mounting strap with break-off plasters ears and provisions for back wiring with separate metal wiring clamps and side wiring with captively held binding screws.
3. Shall be color coded for current rating, listed by Underwriters Laboratories, Inc., and meeting the requirements of NEMA WD1, Heavy-Duty and UL 20.
4. Ratings:
   a. 120 volt circuits: 20 ampere at 120-277 volts AC.
   b. 277 volt circuits: 20 ampere at 120-277 volts AC.
5. The switches shall be mounted on the striker plate side of doors.
6. Incorporate barriers between switches with multigang outlet boxes where required by the NEC.
7. Switches connected to isolated type electrical power system shall be double pole.
8. All toggle switches shall be of the same manufacturer.

2.3 WALL PLATES

A. Wall plates for switches and receptacles shall be type 302 stainless steel. Oversize plates will not be acceptable.

B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.

C. For receptacles or switches mounted adjacent to each other, wall plates shall be common for each group of receptacles or switches.

2.4 SURFACE MULTIPLE-OUTLET ASSEMBLIES

A. Assemblies shall conform to the requirements of NFPA 70 and UL 5.

B. Shall have the following features:

1. Enclosures:
   a. Thickness of steel shall be not less than 1 mm (0.040 inch) steel for base and cover. Nominal dimension shall be 40 by 70 mm (1-1/2 by 2-3/4 inches) with inside cross sectional area not less than 2250 square mm (3.5 square inches). The enclosures shall be thoroughly cleaned, phosphatized and painted at the factory with primer and the manufacturer's standard baked enamel or lacquer finish.
2. Receptacles shall be duplex, hospital grade. See paragraph 'RECEPTACLES' in this section. Device cover plates shall be the manufacturer's standard corrosion resistant finish and shall not exceed the dimensions of the enclosure.

3. Unless otherwise shown on drawings, spacing of the receptacles along the strip shall be 600 mm (24 inches) on centers.
4. Wires within the assemblies shall be not less than #12 AWG copper, with 600 volt ratings.
5. Installation fittings shall be designed for the strips being installed including bends, offsets, device brackets, inside couplings, wire clips, and elbows.
6. Bond the strips to the conduit systems for their branch supply circuits.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the NEC, and as shown as on the drawings.

B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and connected to the green equipment grounding conductor.

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SECTION 16160 EVL.
PANELBOARDS

1.1 DESCRIPTION

This section includes the furnishing, installation and connection of panelboards.

1.2 RELATED WORK

A. Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

B. Section 16450, GROUNDING.

C. Section 16111, CONDUITS: Conduits and outlet boxes.

1.3 SUBMITTALS

In accordance with section 01340, SAMPLES AND SHOP DRAWINGS, furnish the following:

A. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting, material, wiring diagrams, and accessories.

B. Certification: Two weeks prior to final inspection, deliver to the Project Engineer four copies of the following:

1. Certification that the material is in accordance with the drawings and specifications, has been properly installed, and that the loads are balanced.

1.4 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.

A. Underwriters Laboratories, Inc. (UL):

No. 50.....Cabinet and Boxes, Electrical
No. 67.....Panelboards
No. 489.....Molded Case Circuit Breakers and Circuit Breaker
.....Enclosures

B. National Fire Protection Association (NFPA):

No. (latest)...National Electrical Code (NEC)

C. National Electrical Manufacturers Association (NEMA):

No. PB-1.....Panelboards
No. AB-1 Molded Case Circuit Breakers

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Panelboards shall be in accordance with UL, NEMA, NEC, and as shown on the drawings.

B. Provide standard manufactured products. All components of panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards to be of the same manufacturer.

C. All panels shall be dead front safety type. Arrange sections for easy removal without disturbing other sections.

D. All panelboards shall be completely factory assembled with molded case circuit breakers.

E. Panels shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting as scheduled on the drawings.

F. Panelboards shall have the following features:

1. Nonreduced size copper or aluminum bus bars, and connection straps bolted together and rigidly supported on molded insulators. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of branch circuit devices.
2. Full size neutral bar, mounted on insulated supports.
3. Ground bar with sufficient terminals for all grounding wires.
4. All breakers and phase bus connections shall be arranged so that it will be possible to substitute a 2-pole breaker for two single pole breakers, and a 3-pole breaker for three single pole breakers, when trip is 30 amps or less and frame size is 100 amperes or less, without having to drill and tap the main bus bars at bus straps.
5. Design interior so that protective devices can be replaced without removing adjacent units, main bus connectors, and without drilling or tapping. Panel phase bus connections to protective devices shall not be rivetted to the panel bus and shall be field removable by means of a screw driver.
6. Where designated on panel schedule as "space", include all necessary bussing, device support and connections. Provide blank cover for each space.
7. In two section panelboards, the main bus in each section shall be full size. The first section shall be furnished with subfeed lugs on the line side with cable connections to the second section.

Panelboard sections with tapped bus or crossover bus shall not be accepted.

G. Series rated panelboards are not permitted.

2.2 CABINETS AND TRIMS

A. Cabinets:

1. Provide galvanized steel cabinets to house panelboards. Cabinets for distribution panels may be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL standard for outdoor applications.
2. Cabinet enclosure shall not have ventilating openings.
3. Back and sides shall be of one piece formed steel. Cabinets for distribution panels may be of formed sheet steel with end and side panels welded, riveted, or bolted as required.
4. Provide minimum of four interior mounted studs and necessary hardware for "in" and "out" adjustment of panel interior.
5. Cabinets for two section panelboards shall have both sections bolted together, arranged side by side, and shall be the same height. Flush mounted cabinets should be 38 mm (1-1/2 inches) apart and coupled by conduit nipple.
6. Gutter size in panel boxes, on all sides, shall be in accordance with the NEC. Cabinets containing through feeders shall have the gutters space increased by the amount required for auxiliary gutters in the NEC.

B. Trims:

1. Fabricate trim of sheet steel consisting of frame with door attached by concealed hinges. Provide flush or surface trim as shown on the drawings.
2. Flush trims shall overlap the box by at least 19 mm (3/4-inch) all around.
3. Surface trim shall have the same width and height as the box.
4. Flush or surface trims shall not have ventilating openings.
5. Secure trims to back boxes by indicating trim clamps.
6. Provide a welded angle on rear of trim to support and align trim to cabinet.
7. Provide separate trims for each section of multiple section paneloards. Trims and doors of sections shall be of the same height.

C. Doors:

1. Provide doors with flush type latch and manufacturer's standard lock. Doors over 1200 mm (48 inches) in height shall have a vault

handle and a three point catch, arranged to fasten door at top, bottom, and center.

2. In making switching devices accessible, doors shall not uncover any live parts.
3. Provide concealed, butt hinges welded to the doors and trims.
4. For magnetic contactors incorporated in panelboards, provide separate doors for the contactors.
5. Provide keyed alike system for all panelboards. In existing buildings where new panels are installed, provide keyed alike locks as directed by Resident Engineer.
6. Provide a directory card, metal holder, and transparent cover. Permanently mount holders on inside of doors.

D. Painting:

1. Thoroughly clean and paint trims and doors at the factory with primer and manufacturer's standard finish.

2.3 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS

A. Breakers shall be UL listed and labeled, in accordance with the NEC, as shown on the drawings, and as specified.

B. Circuit breakers in panelboards shall be bolt on type on phase bus bar or branch circuit bar.

1. Molded case circuit breakers for lighting and appliance branch circuit panelboards shall have minimum interrupting rating as indicated but not less than:
   a. 120/208 Volt Panelboard: 22,000 amperes symmetrical.
   b. 120/240 Volt Panelboard: 22,000 amperes symmetrical.
   c. 277/480 Volt Panelboard: 14,000 amperes symmetrical.
2. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100 ampere frame or less. Magnetic trip shall be adjustable from 3X to 10X for breakers with 600 ampere frames and higher. Factory setting shall be HI, unless otherwise noted.

C. Breaker features shall be as follows:

1. A rugged, integral housing of molded insulating material.
2. Silver alloy contacts.
3. Arc quenchers and phase barriers for each pole.
4. Quick-make, quick-break, operating mechanisms.
5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
6. Electrically and mechanically trip free.

7. An operating handle which indicates ON, TRIPPED, and OFF positions.
8. Line connections shall be bolted.
9. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals as indicated in these specifications.
10. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.
11. For circuit breakers being added to existing panelboards, coordinate the breaker type with existing panelboards. Modify the panel directory.

2.4 SEPARATELY ENCLOSED MOLDED CASE CIRCUIT BREAKERS

A. Where separately enclosed molded case circuit breakers are shown on the drawings, provide circuit breakers in accordance with the applicable requirements of those specified for panelboards.

B. Enclosures are to be of the NEMA types shown on the drawings. Where the types are not shown, they are to be the NEMA type most suitable for the environmental conditions where the breakers are being installed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with NEC, and as specified.

B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes of cabinets with designated closet space.

C. Paint the panelboard system voltage, and feeder sizes as shown on the riser diagram in one inch block lettering on the inside cover of the cabinet door. Paint the words "LIFE SAFETY BRANCH", "CRITICAL BRANCH", "EMERGENCY SYSTEM", or "EQUIPMENT SYSTEM" as applicable and the panel designation in one inch block letters on the outside of the cabinet doors.

D. Install a typewritten schedule of circuits in each panelboard after approval by the Project Engineer. Schedule shall be typed on the panel directory cards. Include the room numbers and items served on the cards.

E. Mount the panelboard so that maximum height of circuit breaker above finished floor shall not exceed 1980 mm (78 inches). For panelboards which are too high, mount panelboard so that the bottom of the cabinets will not be less than 150 mm (6 inches) above the finished floor.

F. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.
G. Circuit numbers indicated on the drawings are shown for the purpose of clarifying the grouping of outlets. The actual number assigned to the circuit in the panelboard shall suit the bussing and branch circuiting to the panel.
H. Where new panels are to be installed in existing backboxes, backboxes shall have rust and scale removed from inside. Paint inside of backboxes with rust preventive paint before the new panel interior is installed. Provide new trim and doors for these panels.

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SECTION 16170 EVL.
DISCONNECT SWITCHES (MOTOR AND CIRCUIT)

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of low voltage disconnect switches.

1.2 RELATED WORK

A. General electrical requirements and items that are common to more than one section of Division 16: Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

B. Conduits for cables and wiring: Section 16111, CONDUIT SYSTEMS.

C. Cables and wiring: Section 16127, CABLES, LOW VOLTAGE (600 VOLTS AND BELOW).

D. Requirements for personnel safety and to provide a low impedance path for possible ground faults: Section 16450, GROUNDING.

1.3 SUBMITTALS

Submit in accordance with Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

A. Shop Drawings:

1. Include sufficient information, clearly presented, to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting details, materials, enclosure types, fuse type and class.
3. Show the specific switch and fuse proposed for each specific piece of equipment or circuit.

B. Manuals:

1. Provide complete maintenance and operating manuals for disconnect switches, including technical data sheets, wiring diagrams, and information for ordering replacement parts. Deliver four copies to the Project Engineer two weeks prior to final inspection.
2. Identify terminals on wiring diagrams to facilitate maintenance and operation.
3. Wiring diagrams shall indicate internal wiring and any interlocking.

C. Certification: Two weeks prior to final inspection, deliver to the Resident Engineer four copies of the certification that the equipment has been properly installed, adjusted, and tested.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent

referenced. Publications are referenced in the text by the basic designation only.

B. National Electrical Manufacturers Association (NEMA):
KS l-96.....Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

C. National Fire Protection Association (NFPA):
70-(latest).....National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):
98-94.....Enclosed and Dead-Front Switches
198C-86.....High-Interrupting-Capacity Fuses, Current Limiting Types
198E-88.....Class R Fuses
977-94.....Fused Power-Circuit Devices

PART 2 - PRODUCTS

2.1 LOW VOLTAGE FUSIBLE SWITCHES RATED 600 AMPERES AND LESS

A. Shall be quick-make, quick-break type in accordance with UL 98, NEMA KS 1 and NEC.

B. Shall have a minimum duty rating, NEMA classification General Duty (GD) for 240 volts and NEMA classification Heavy Duty (HD) for 277/480 volts.

C. Shall be horsepower rated.

D. Shall have the following features:

1. Switch mechanism shall be the quick-make, quick-break type.
2. Copper blades, visible in the OFF position.
3. An arc chute for each pole.
4. External operating handle shall indicate ON and OFF position and shall have lock-open padlocking provisions.
5. Mechanical interlock shall permit opening of the door only when the switch is in the OFF position, defeatable by a special tool to permit inspection.
6. Fuse holders for the sizes and types of fuses specified.
7. Solid neutral for each switch being installed in a circuit which includes a neutral conductor.
8. Ground Lugs: One for each ground conductor.
9. Enclosures:
   a. Shall be the NEMA types shown on the drawings for the switches.
   b. Where the types of switch enclosures are not shown, they shall be the NEMA types which are most suitable for the environmental conditions where the switches are being installed.
   c. Shall be finished with manufacturer’s standard gray baked enamel paint over pretreated steel (for the type of enclosure required).

2.2 LOW VOLTAGE UNFUSED SWITCHES RATED 600 AMPERES AND LESS

Shall be the same as Low Voltage Fusible Switches Rated 600 Amperes and Less, except it shall not accept fuses.

2.3 LOW VOLTAGE FUSIBLE SWITCHES RATED OVER 600 AMPERES TO 1200 AMPERES

Shall be the same as Low Voltage Fusible Switches Rated 600 Amperes and Less except the minimum duty rating shall be NEMA classification Heavy Duty (HD). These switches shall also be horsepower rated.

2.4 IDENTIFICATION SIGNS

A. Install nameplate identification signs on each disconnect switch to identify the equipment controlled.

B. Nameplates shall be laminated black phenolic resin with a white core, with engraved lettering, a minimum of 6 mm (1/4-inch) high. Secure nameplates with screws.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switches in accordance with the NEC and as shown on the drawings.

B. Fusible disconnect switches shall be furnished complete with fuses.

3.2 SPARE PARTS

Two weeks prior to the final inspection, furnish one complete set of spare fuses for each fusible disconnect switch installed on the project. Deliver the spare fuses to the Project Engineer.

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SECTION 16450 EVL.
GROUNDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies general grounding and bonding requirements of electrical installations for personnel safety and to provide a low impedance path for possible ground fault currents.

B. “Grounding electrode system” refers to all electrodes required by NEC, as well as including made, supplementary, lightning protection system and telecommunications system grounding electrodes.

C. The terms “connect” and “bond” are used interchangeably in this specification and have the same meaning.

1.2 RELATED WORK

A. Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL): General electrical requirements and items that are common to more than one section of Division 16.

B. Section 16127, CABLES, LOW VOLTAGE (600 VOLTS AND BELOW): Low Voltage power and lighting wiring.

1.3 SUBMITTALS

A. Submit in accordance with Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include the location of system grounding electrode connections and the routing of aboveground and underground grounding electrode conductors.

C. Test Reports: Provide certified test reports of ground resistance.

D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:

1. Certification that the materials and installation is in accordance with the drawings and specifications.
2. Certification, by the Contractor, that the complete installation has been properly installed and tested.

1.4 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

A. National Fire Protection Association (NFPA):

70-(latest).....National Electrical Code (NEC)

B. Underwriters Laboratories, Inc. (UL):
44-1999.....Thermoset-Insulated Wires and Cables
83-1998.....Thermoplastic-Insulated Wires and Cables
467-1993.....Grounding and Bonding Equipment
486A-2000.....Wire Connectors and Soldering Lugs for Use With Copper Conductors

C. American Society for Testing and Materials (ASTM):
B1-2001.....Standard Specification for Hard-Drawn Copper Wire

D. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
81-1983.....IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per NEC.

B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes No. 10 AWG and smaller shall be ASTM B1 solid bare copper wire.

C. Isolated Power System: Type XHHW-2 insulation with a dielectric constant of 3.5 or less.

D. Conductor sizes shall not be less than what is shown on the drawings and not less than required by the NEC, whichever is greater.

PART 3 - EXECUTION

3.1 GENERAL

A. Ground in accordance with the NEC, as shown on drawings, and as hereinafter specified.

B. System Grounding:
1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
3. Isolation transformers and isolated power systems shall not be system grounded.

C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, raceways, junction boxes, outlet boxes,

cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.2 SECONDARY EQUIPMENT AND CIRCUITS

A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.

B. Service Disconnect (Separate Individual Enclosure): Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.

C. Conduit Systems:

1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor.
2. Non-metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
3. Conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.

D. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders and power and lighting branch circuits.

E. Boxes, Cabinets, Enclosures, and Panelboards:

1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes (except for special grounding systems for intensive care units and other critical units shown).
2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.

F. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.

G. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.

H. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

I. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

J. Panelboard Bonding: The equipment grounding terminal buses of the normal and essential branch circuit panelboards serving the same individual patient vicinity shall be bonded together with an insulated continuous copper conductor not less than No. 10 AWG. These conductors shall be installed in rigid metal conduit.

3.3 TELECOMMUNICATIONS SYSTEM

Bond telecommunications system grounding equipment to the electrical grounding electrode system.

3.4 GROUND RESISTANCE

A. Grounding system resistance to ground shall not exceed 5 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Government. Final tests shall assure that this requirement is met.

B. Services at power company interface points shall comply with the power company ground resistance requirements.

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